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THE LEAF-COLLECTOR'S HAND-BOOK AND HERBARIUM

AN AID IN THE PRESERVATION AND IN THE CLASSIFICATION OF SPECIMEN LEAVES OF THE TREES OF NORTHEASTERN AMERICA

BY

CHARLES S. NEWHALL

AUTHOR OF "THE TREES OF NORTHEASTERN AMERICA," ETC.

ILLUSTRATED

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PREFACE.

The leaves described and pictured in the following pages represent all the native trees, and the most important introduced and naturalized trees of Northeastern America,*—with the few exceptions named on page 213.

Those species are considered trees (in distinction from shrubs) which, as a rule, spring from the ground with a single branching trunk.†

How to use the book will be readily understood by consulting the following directions.

* The names of introduced and naturalized species are enclosed in brackets.

† "Trees of Northeastern America," page 4.



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DIRECTIONS.

1. *How to find the names of specimens.*—Compare any given specimen, first with the descriptions in the "Guide," on pages xiv and xv, and then with the illustrations to which the "Guide" directs.*

2. *How to mount specimens.*—When the specimens have been pressed and *thoroughly dried*, and all their thick stems removed or pared, they should be fastened in their places opposite the corresponding illustrations, with strips of gummed paper an eighth of an inch or less in width.†

The compound leaves and the simple leaves, when they are larger than the allotted space, should be represented by sections of the leaf.

3. *How to preserve specimens.*—If the collection is attacked by insects, each leaf should be brushed lightly with a *saturated solution of corrosive sublimate and alcohol, increased by two thirds more of alcohol.*

4. *Notes.*—Interest and value will be added to the collection if full memoranda are kept of dates, localities, name of the finder, incidents, characteristics of the tree, etc.

5. It should be remembered that leaves from vigorous young sprouts are not usually the best specimens. It is seldom that two leaves, even upon the same mature branch, exactly agree, but they follow the type, while often the younger growth varies from it.‡

* If fuller descriptions and comments are desired, they can be found in the author's work on "The Trees of Northeastern America."

† A supply of gummed paper will be found at the end of the volume.

‡ "The Trees of Northeastern America," page 4.



A-

Magnolia . . .
Asimina . . .
Cercis . . .
Nyssa . . .
Diospyros . . .
Sassafras . . .

I

Tilia . . .
Ilex . . .
Prunus . . .
Pyrus . . .
Crataegus . . .
Amelanchier . . .
Oxydendrum . . .
Ulmus . . .
Celtis . . .
Morus . . .
Broussonetia . . .
Platanus . . .
Betula . . .
Ostrya . . .
Carpinus . . .
Castanea . . .
Fagus . . .
Salix . . .
Populus . . .



LIST OF GENERA.

A—I		III (a)		PAGE	
	PAGE		PAGE		
Magnolia	3	Liriodendron	85	Larix	155
Asimina	7	Quercus	87	Chamaecyparis	157
Cercis	9			Thuja	157
Nyssa	11	(b)		Juniperus	159
Diospyros	13	Liquidamber	115		
Sassafras	15				
II		B—I		D—I	
Tilia	19			Ailanthus	163
Ilex	21	Cornus	119	Robinia	165
Prunus	23	Chionanthus	123	Gymnocladus	167
Pyrus	27	Catalpa	125	Gleditschia	169
Crataegus	29			II	
Amelanchier	35			Rhus	173
Oxydendrum	37	II		Pyrus	127
Ulmus	39	Viburnum	129	Juglans	179
Celtis	41			Hicoria	181
Morus	43	III			
Broussonetia	43	Acer	133		
Platanus	45			E—I—II	
Betula	47			Negundo	193
Ostrya	53	C		Fraxinus	195
Carpinus	55				
Castanea	57	Pinus	145		
Fagus	59	Picea	149		
Salix	69	Tsuga	153		
Populus	71	Abies	155	F	
				Aesculus	207



GUIDE.

Leaves, simple : *	{	alternate†	{	edge entire.	Go to A—I		
				" toothed.	" A—II		
				{	{	Lobes, entire.	Go to A—III (a
						Lobes, toothed.	" A—III (b
		opposite	{	{	edge entire.	Go to B—I	
" toothed.	" B—II						
{	{				Lobes, entire.	Go to B—III (a	
					Lobes, toothed.	" B—III (b	
Indeterminate.			Go to C—I				

Leaves, compound :	{	feather-shaped †	{	{	alternate,	{	edge { entire.	Go to D—i		
					toothed.		" D—i			
				{	{	{	opposite,	{	edge { entire.	Go to E—i
							toothed.		" E—i	
		hand-shaped §	{	{	{	{	opposite,	edge toothed.	Go to F—	

* The leaflets of a compound leaf can be distinguished from a simple leaf by absence of leaf-buds from the base of their stems.

† Referring to the arrangement of the leaves on the branch.

‡ *E. g.*, as in the hickories, sumachs, etc.

§ *E. g.*, as in the horse-chestnut, etc.

Magnolia
Papaw
Cam, sou
Judas-tre
Persimm
Sassafras
Oak, will
Dog-woo
Willow,
Basswood
Hollies
Cherries
Plum .
Crab-app
Thorns
Shad-bus
Sorrel-tre
Elms .
Hackberry
Mulberry
Mulberry
Button-w
Birches
Hornbeam
Hornbeam
Chestnut
Beech
Willows
Poplars
Oaks, che



GUIDE (Continued).

NOTE.—Names in *italics* are given also under another division.

A—I		III (a)		D—I	
	PAGE		PAGE		PAGE
Magnolias	6-8	Tulip-tree	98	Ailanthus	186
Papaw	10	Oaks	101	Locusts	188-190
Gum, sour	12	<i>Sassafras</i>	18	Coffee-tree, Kentucky, 190	
Judas-tree	12	<i>Button-wood</i>	53	Locust, honey	192
Persimmon	16			Sumach, poison	198
<i>Sassafras</i>	18	(b)			
Oak, willow	126	Gum, sweet	130	II	
Dog-wood, alt. leaved . 136		Poplar, silver-leaf	94	Sumach, staghorn	196
<i>Willow, long-beaked</i> . 78		<i>Mulberry</i>	50	Ash, mountain	200
		<i>Mulberry, paper</i>	52	Walnut, black	203
II		<i>Oaks</i>	101	Butternut	204
Basswoods	22-24			Hickories	206-214
Hollies	24-26	B—I		<i>Locust, honey</i>	192
Cherries	27-28				
Plum	30	Dog-wood, flowering . 134		E—I	
Crab-apple	32	Fringe-tree	138	<i>Ash, red and white, 220-222</i>	
Thorns	34-38	Catalpa	140	II	
Shad-bush	40			Ash-leaved maple	218
Sorrel-tree	42	II		Ash, black, blue, green,	
Elms	44-47	Black haw	144	red, and white . 220-228	
Hackberry	48	Viburnum, sweet	146		
<i>Mulberry</i>	50	III (a)			
<i>Mulberry, paper</i>	52	(b)			
<i>Button-wood</i>	53	Maples	148-156		
Birches	55-62				
Hornbeam, Hop	64	C—I		F—I	
Hornbeam	66			Buckeyes	232-234
Chestnut	68	Pines, cedars, spruce,		Horse-chestnut	234
Beech	70	etc.	160		
Willows	72-83				
Poplars	84-94				
Oaks, chestnut	101				

from a simple leaf by

ach.

LEAVES

A (c)

I (c)

Magnolias
 Papaw .
 Cam, sour
 Judas-tree
 Persimmon
 Sassafras .
 Oak, willow
 Dogwood, a
 Willow, lon

II (c)

Basswoods
 Hollies .
 Cherries .
 Plum . .
 Crab-apple
 Thorns .
 Shad-bush
 Sorrel-tree
 Elms . .
 Hackberry
 Mulberry .
 Buttonwood
 Birches .
 Hornbeam, l
 Hornbeam
 Chestnut .
 Beech . .
 Willows .
 Poplars .
 Oaks, chestn

Guide.

XV

GUIDE (Continued).

NOTE.—Names in *italics* are given also under another division.

LEAVES—SIMPLE		III (edge lobed)		LEAVES—COMPOUND	
A (alternate)		(a) (lobes entire)		I feather-shaped	
I (edge entire)		PAGE		D (edge alternate)	
PAGE		Tulip-tree		I (entire)	
Magnolias		85		PAGE	
Popaw		99		Ailanthus	
Cham, sour		15		Locusts	
Judas-tree		45		Coffee-tree, Kentucky. .	
Persimmon		(b) (lobes toothed)		Locust, honey	
Sassafras		Gum, sweet		Sumach, poison	
Oak, willow		115		II (edge toothed)	
Dogwood, alt.-leaved .		81		Sumach, staghorn	
Willow, long-beaked .		43		Ash, mountain	
67		Oaks		Walnut, black	
88		B		Butternut	
II (edge toothed)		(opposite)		Hickories	
Basswoods		I (edge entire)		Locust, honey	
Hollies		Dogwood, flowering . .		E (opposite)	
Cherries		119		I (edge entire)	
Plum		123		Ash, red and white . . .	
Crab-apple		125		II (edge toothed)	
Thorns		II (edge toothed)		Ash-leaved maple	
Shad-bush		Black haw		Ash, black, blue, green,	
Sorrel-tree		129		red, and white, 195-203	
Elms		III (edge lobed)		2 hand-shaped	
Hackberry		(a) (lobes entire)		F (opposite)	
Mulberry		(b) (lobes toothed)		I (edge toothed)	
Buttonwood		Maples		Buckeyes	
Birches		133		Horse-chestnut	
Hornbeam, Hop		C (indeterminate)			
Hornbeam		I			
Chestnut		Pines, cedars, spruce,			
Beech		etc.			
Willows		145			
Poplars					
Oaks, chestnut					
95					

TR

TREES WITH SIMPLE LEAVES

LEAVES ALTERNATE

(EDGE ENTIRE)

A I



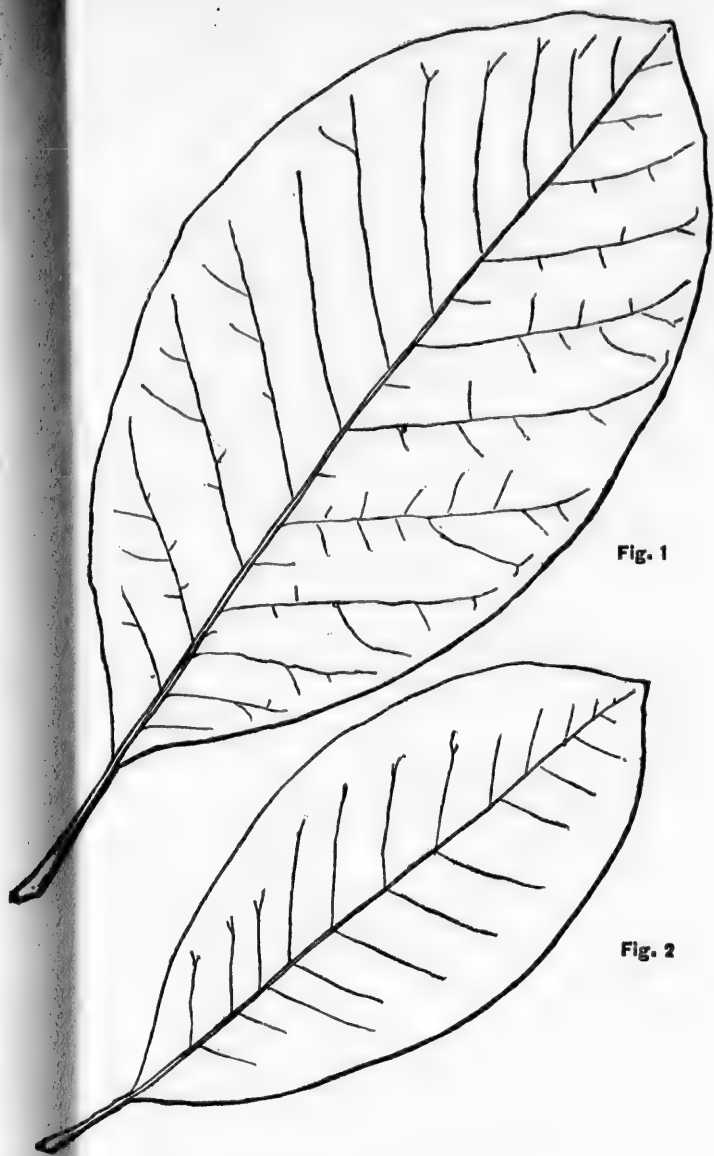


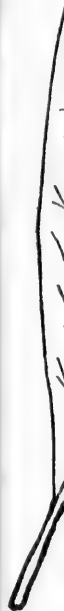
Fig. 1

Fig. 2

Fig. 1.—Cucumber Tree. (*M. acuminata*, L.)

Fig. 2.—Sweet Bay. (*M. glauca*, L.)

NATURAL SIZE.



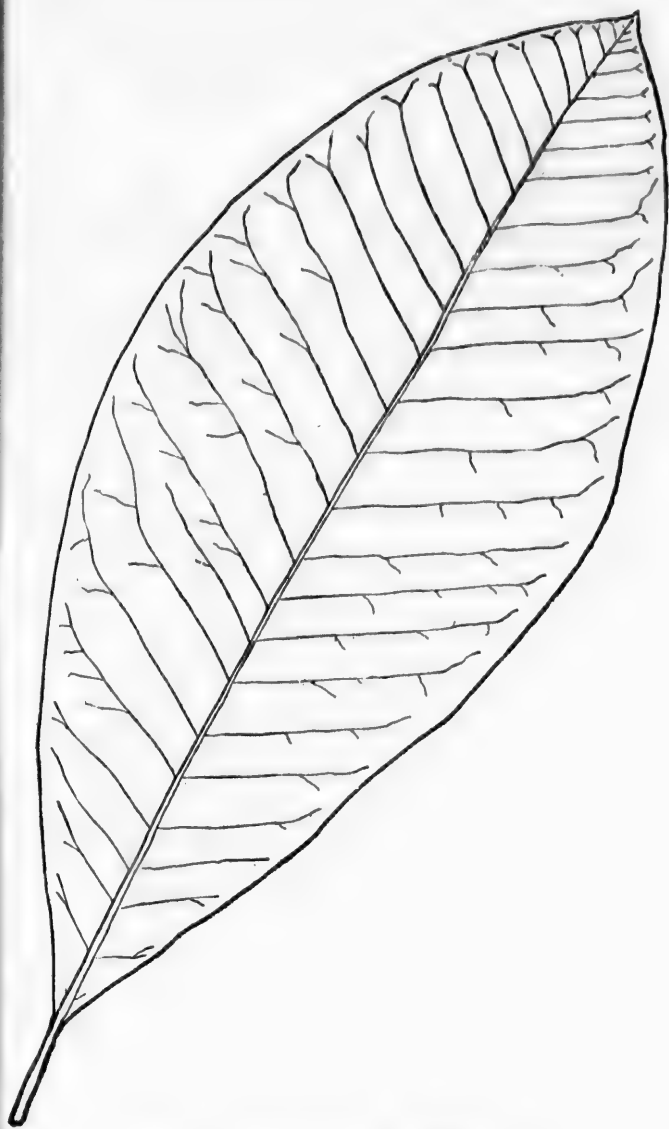


Fig. 3.—Umbrella Tree. (*M. tripetala*, L.)
ONE THIRD NATURAL SIZE.



LEAF,

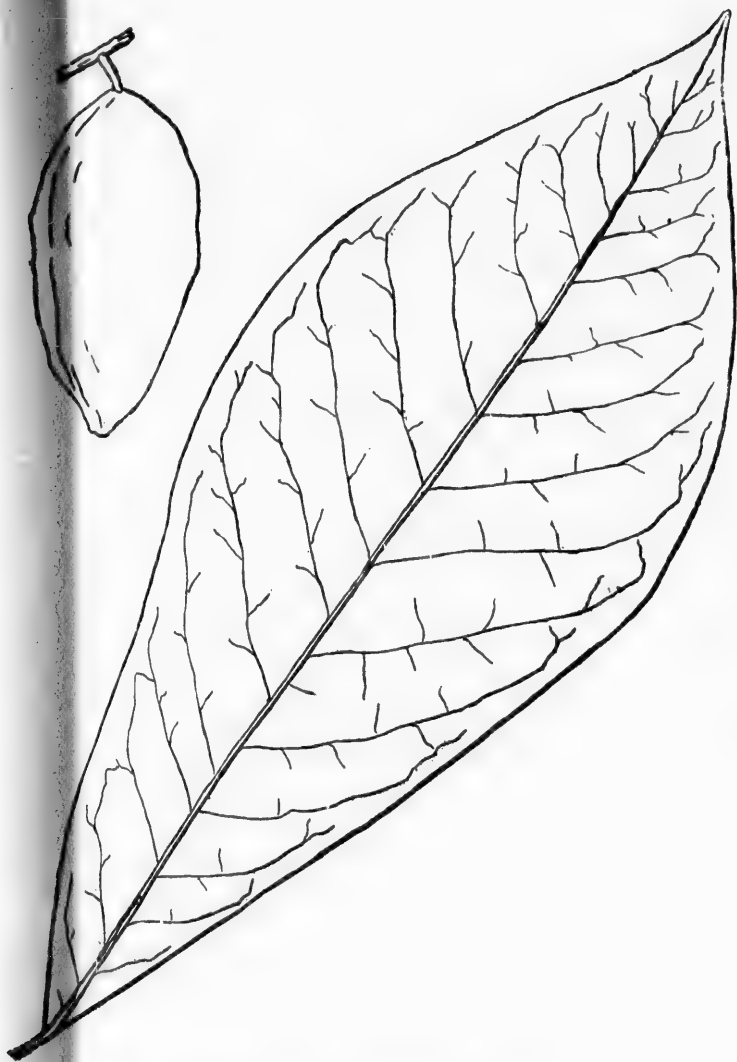


Fig. 4.—Papaw. *A. triloba* (L.), Dunal.
LEAF, NATURAL SIZE. FRUIT, TWO THIRDS NATURAL SIZE.



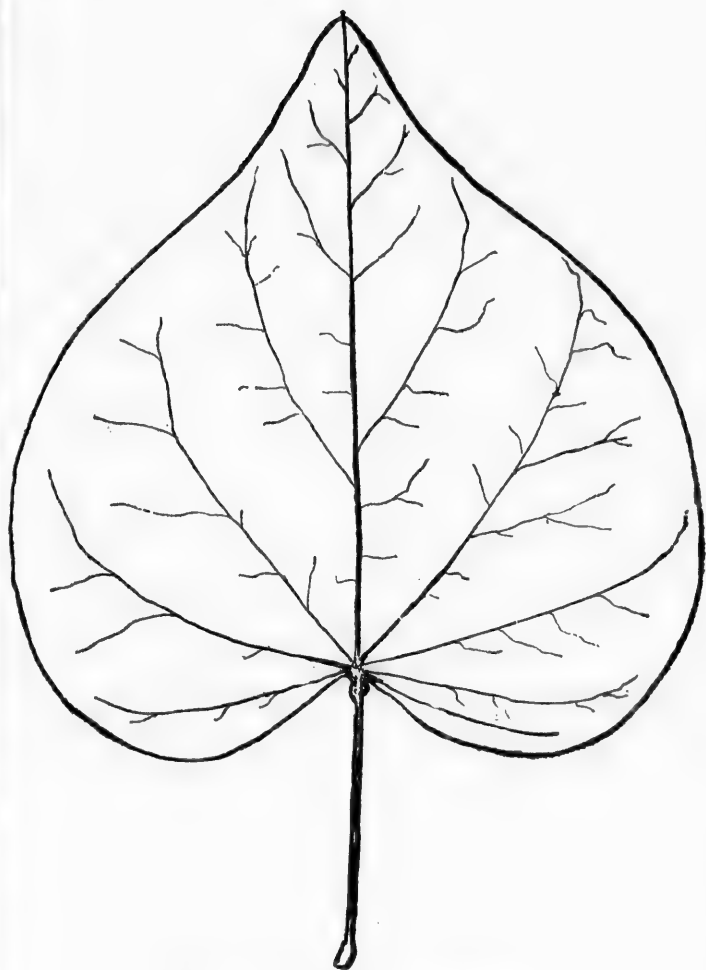


Fig. 5.—Red Bud. (*C. Canadensis*, L.)
NATURAL SIZE.





Fig. 3.—Sour Gum. (*N. sylvatica*, M. sh.)
NATURAL SIZE.



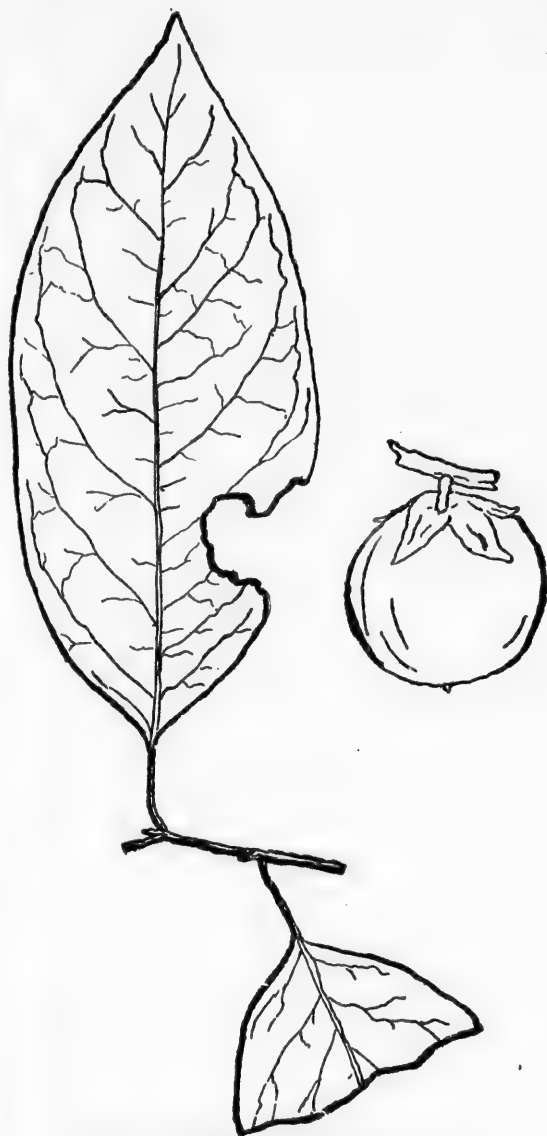


Fig. 7.—Persimmon. (*D. Virginiana*, L.)
NATURAL SIZE.



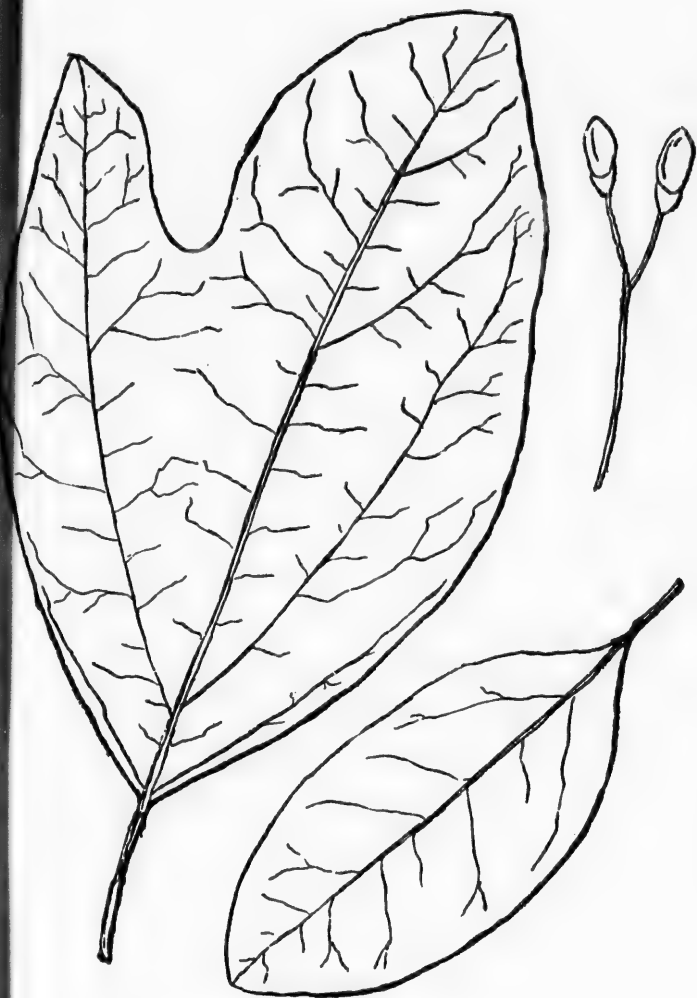


Fig. 8.—*Sassafras*. (*S. officinale*, Nees.)
NATURAL SIZE.

TRI

TREES WITH SIMPLE LEAVES

LEAVES ALTERNATE

CONTINUED

(EDGE TOOTHED)

A II



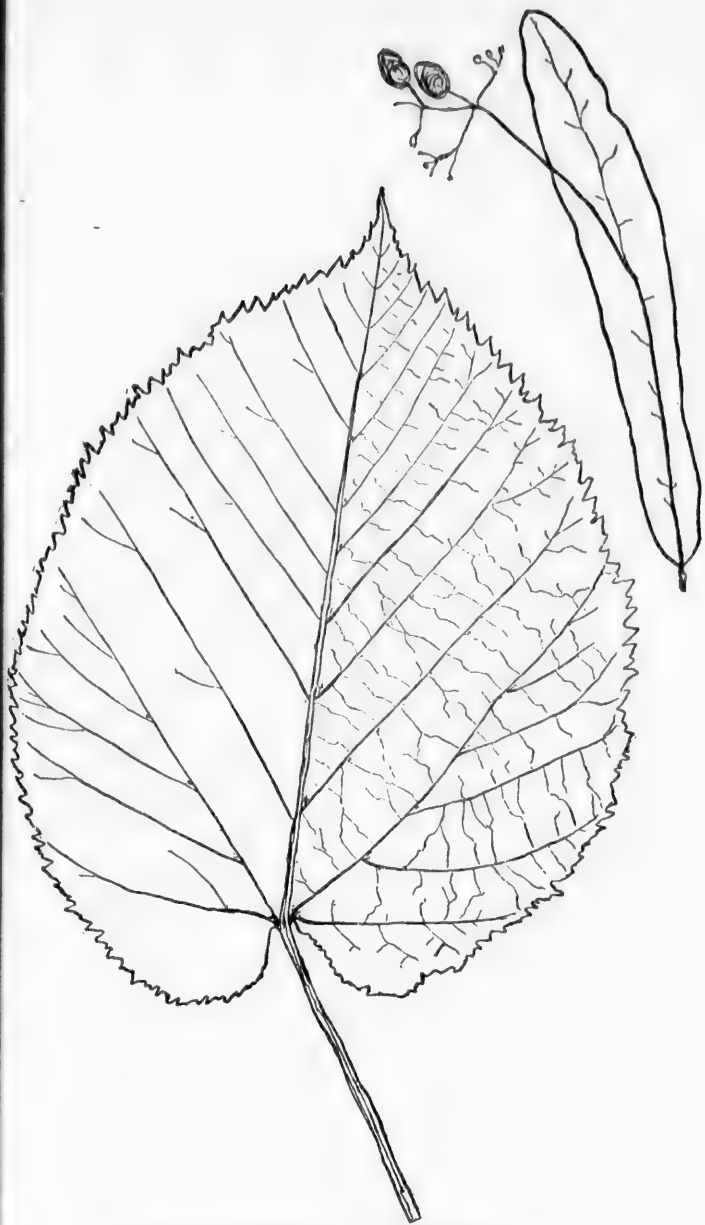


Fig. 9.—Basswood. (*T. Americana*, L.)
NATURAL SIZE.



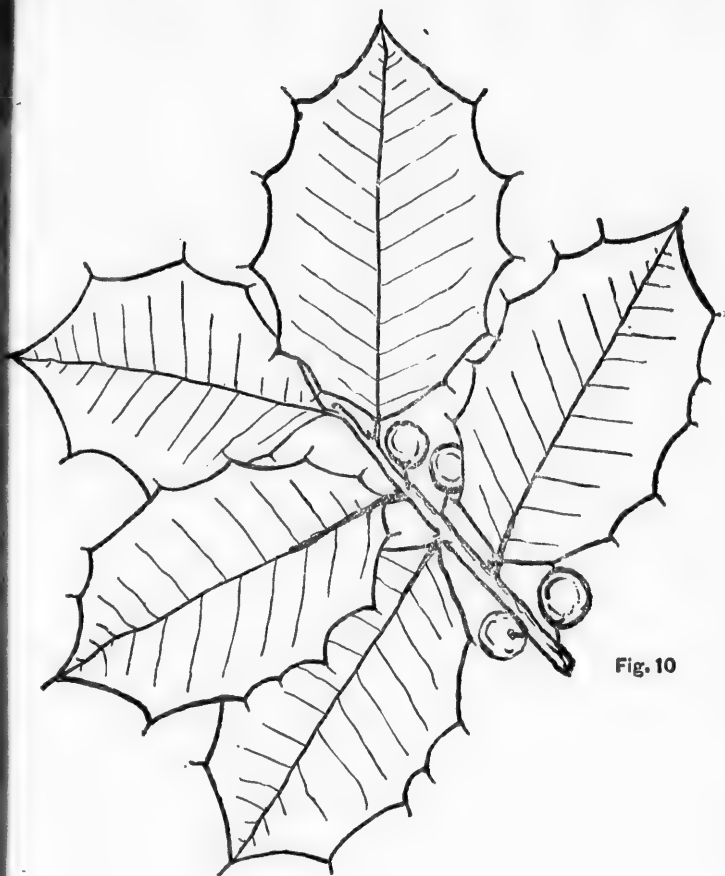


Fig. 10

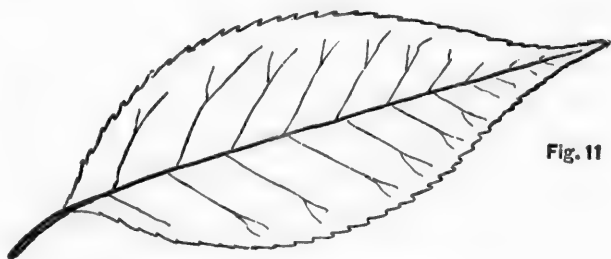


Fig. 11

Fig. 10.—American Holly. (*I. opaca*, Ait.)

Fig. 11.—*I. monticola*.

NATURAL SIZE.



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Fig

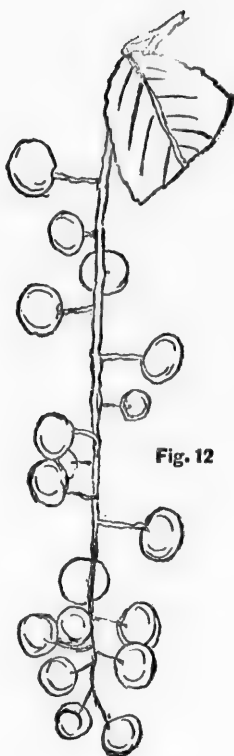
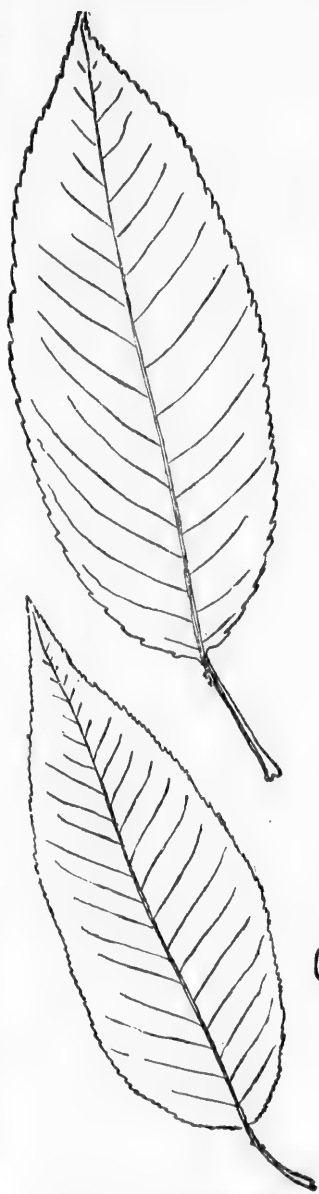


Fig. 12

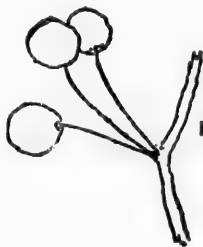


Fig. 13

Fig. 12.—Wild Black Cherry. (*P. serotina*, Ehr.)
 Fig. 13.—Wild Red Cherry. (*P. Pennsylvanica*, L).
 NATURAL SIZE.





Fig. 14.—Wild Plum. (*P. Americana*, Marsh.)
NATURAL SIZE.



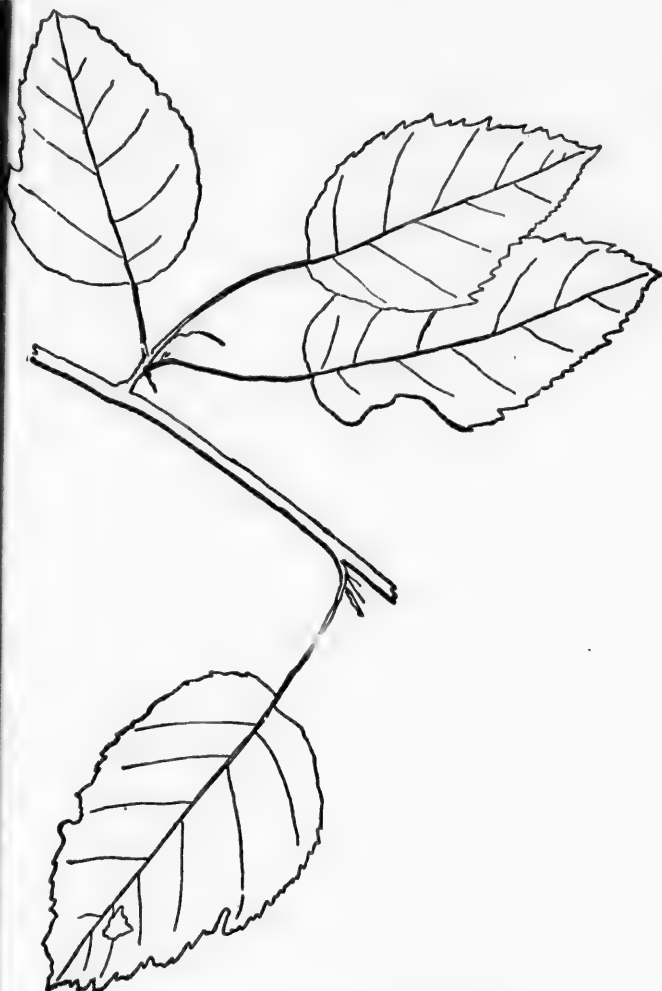


Fig. 15.—Crab-Apple. (*P. coronaria*, L.)
NATURAL SIZE.



Fig



Fig. 16

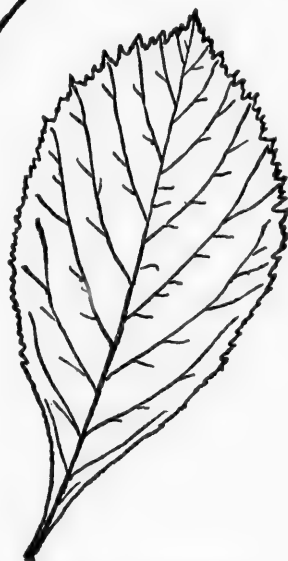


Fig. 17

Fig. 16.—White Thorn and Fruit. (*C. coccinea*, L.)
 Fig. 17.—Black Thorn. (*C. tomentosa*, L.)
 NATURAL SIZE.

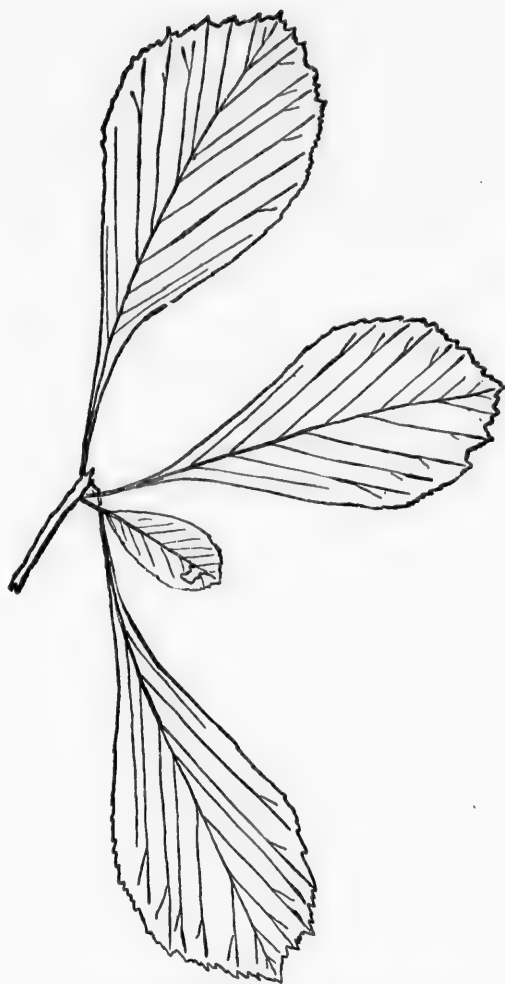


Fig. 18.—Common Thorn. (*C. punctata*, Jac.)
NATURAL SIZE.





Fig. 19.—Cockspur Thorn. (*C. crus-galli*, L.)
NATURAL SIZE.



Fig.

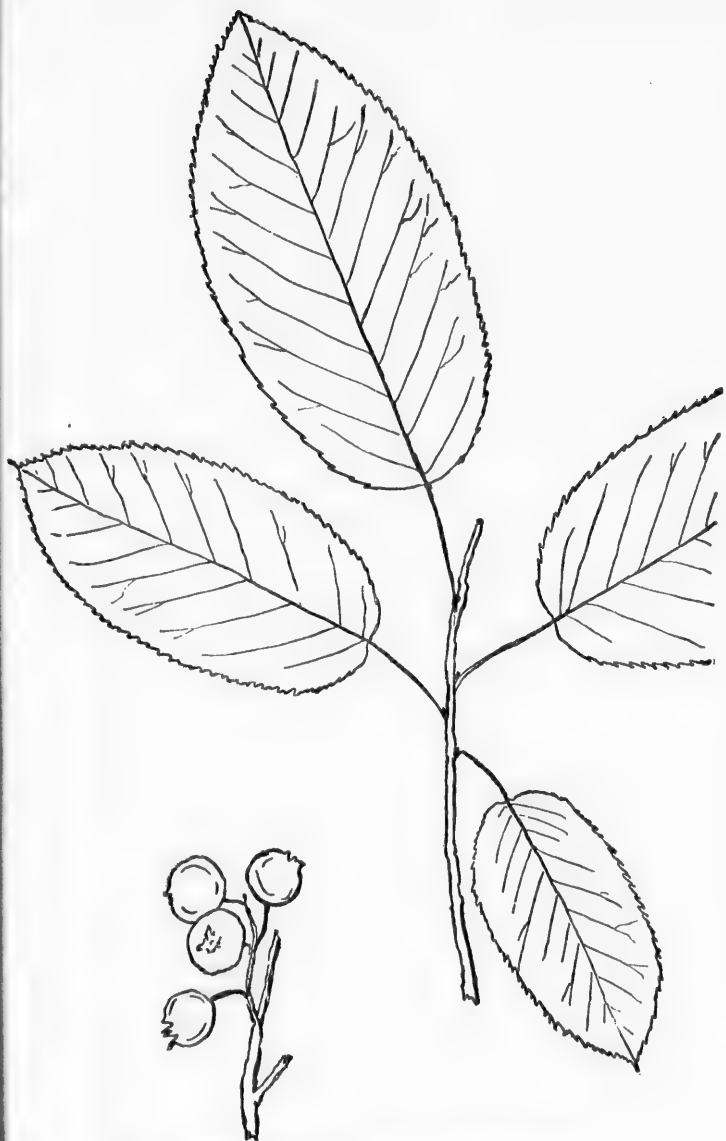


Fig. 29.—Shad-bush. *A. Canadensis* (L.), Medik.
NATURAL SIZE.



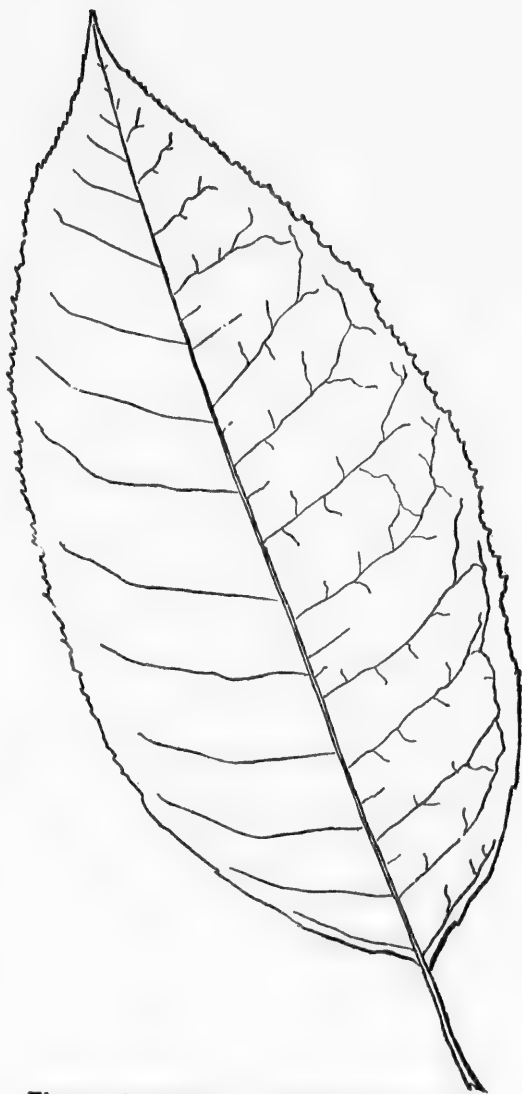


Fig. 21.—Sorrel Tree. *O. arboreum* (L.), D. C.
NATURAL SIZE.



F

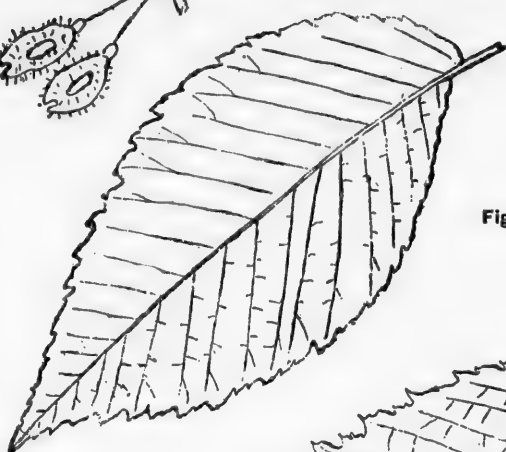


Fig. 22

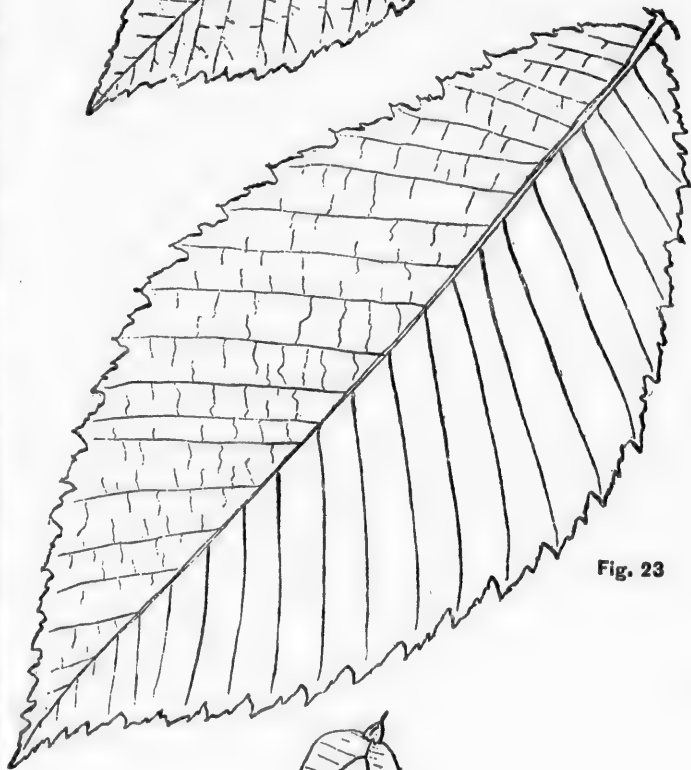


Fig. 23



Fig. 22.—White Elm. (*U. Americana*, L.)
Fig. 23.—Slippery Elm. (*U. fulva*, Michaux.)

NATURAL SIZE.





Fig. 24.—Hackberry. (*C. occidentalis*, L.)
NATURAL SIZE.



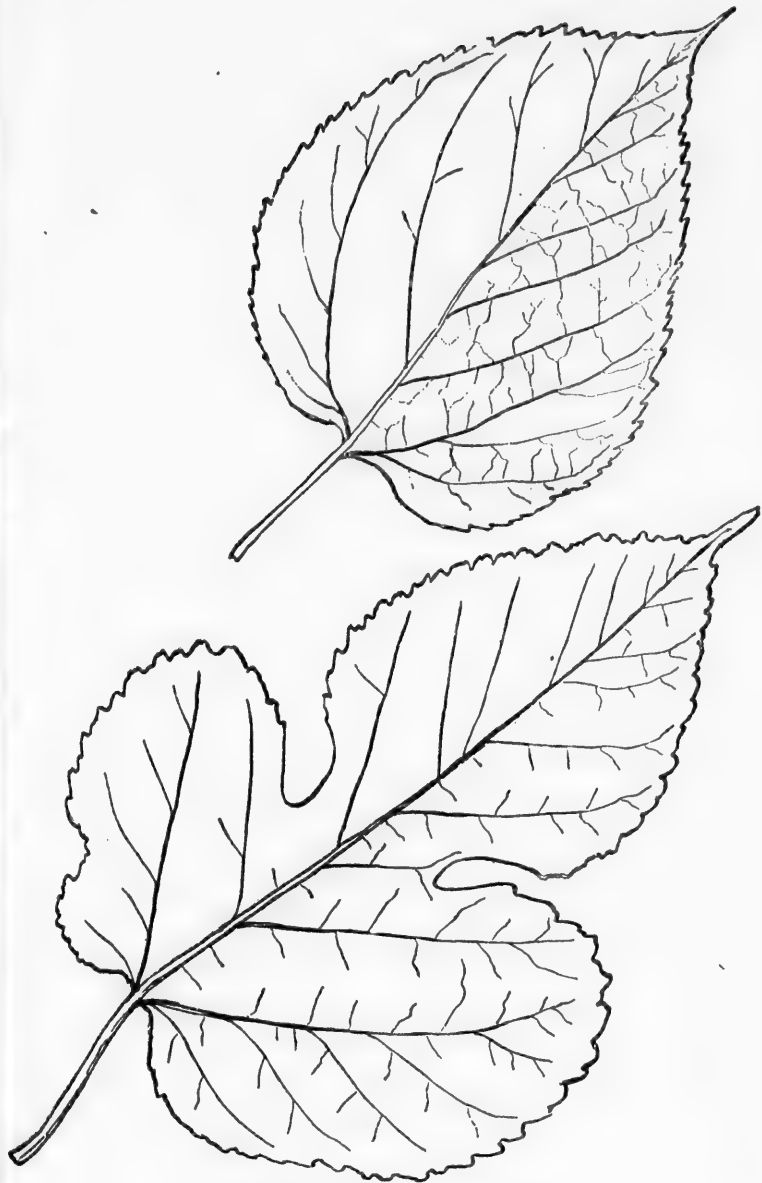


Fig. 25.—Red Mulberry. (*M. rubra*, L.)
NATURAL SIZE.

十
八
七
六
五
四
三
二
一



Fig. 26.—Buttonwood. (*P. occidentalis*, L.)
NATURAL SIZE



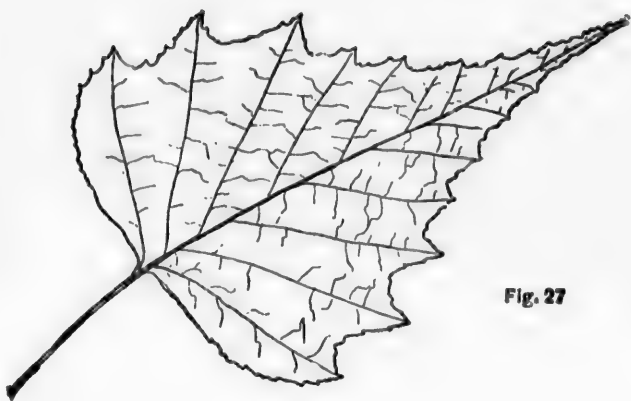


Fig. 27

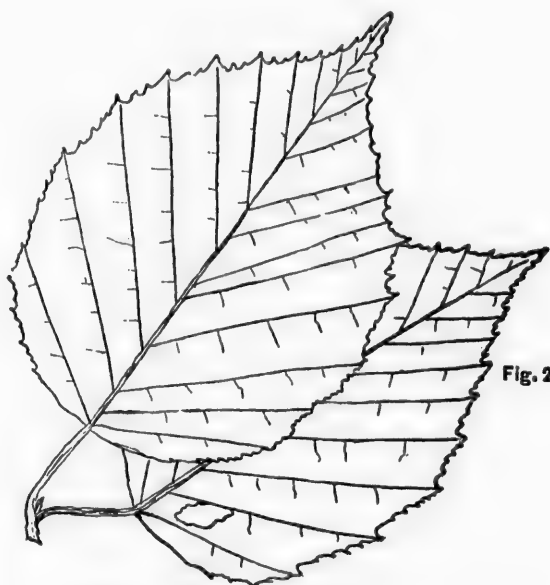


Fig. 28

Fig. 27.—White Birch. (*B. populifolia*, Marsh.)
Fig. 28.—Paper Birch. (*B. papyrifera*, Marsh.)

NATURAL SIZE.





Fig. 29

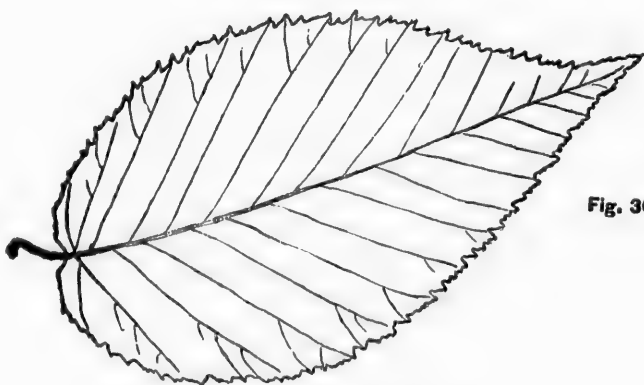


Fig. 30

Fig. 29.—Red Birch. (*B. nigra* L.)

Fig. 30.—Yellow Birch. (*B. lutea*, Michaux, f.)

NATURAL SIZE.





Fig. 31.—Sweet Birch. (*B. lenta*, L.)
NATURAL SIZE.

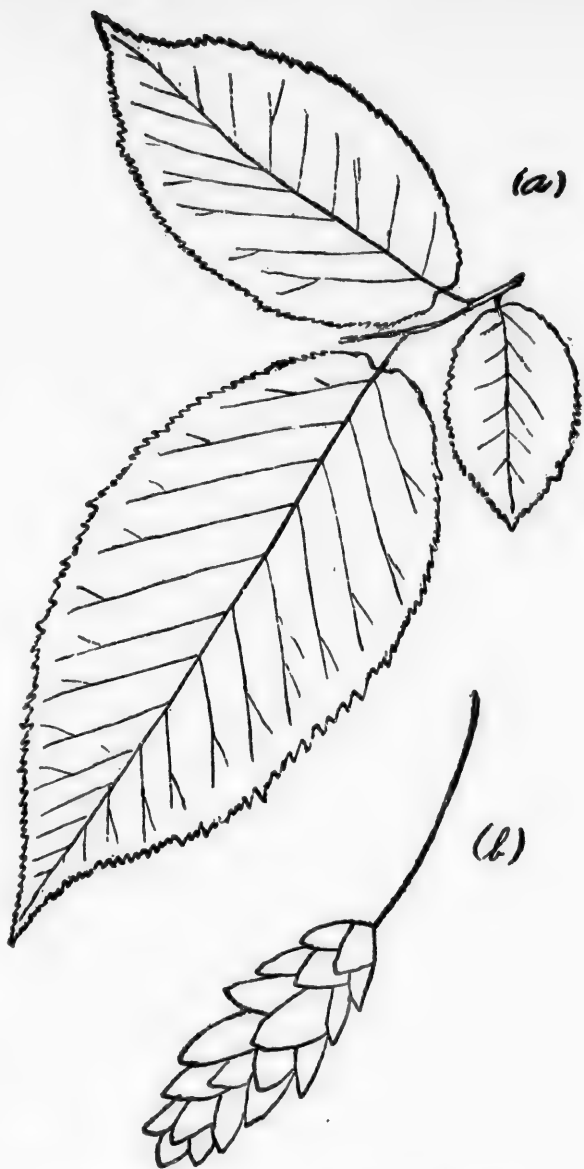


Fig. 32.—Hop-Hornbeam. *O. Virginiana* (Mill), Willd.
a. Leaves. b. Fruit.
NATURAL SIZE.





(a.)



(b)

Fig. 33.—Hornbeam. (*C. Caroliniāna*, Walt.)

a. Fruit scales. b. Leaves.

NATURAL SIZE.

Fig. 3

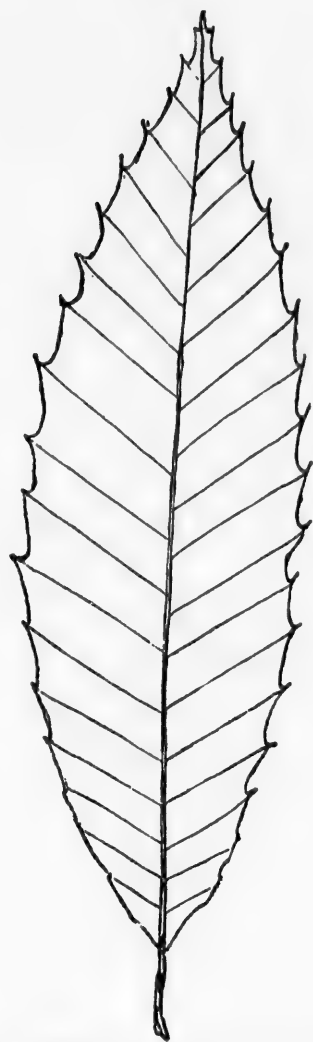


Fig. 34.—Chestnut. *C. Sativa* (L.), var. *Americana* (Michaux), Sarg.
NATURAL SIZE.



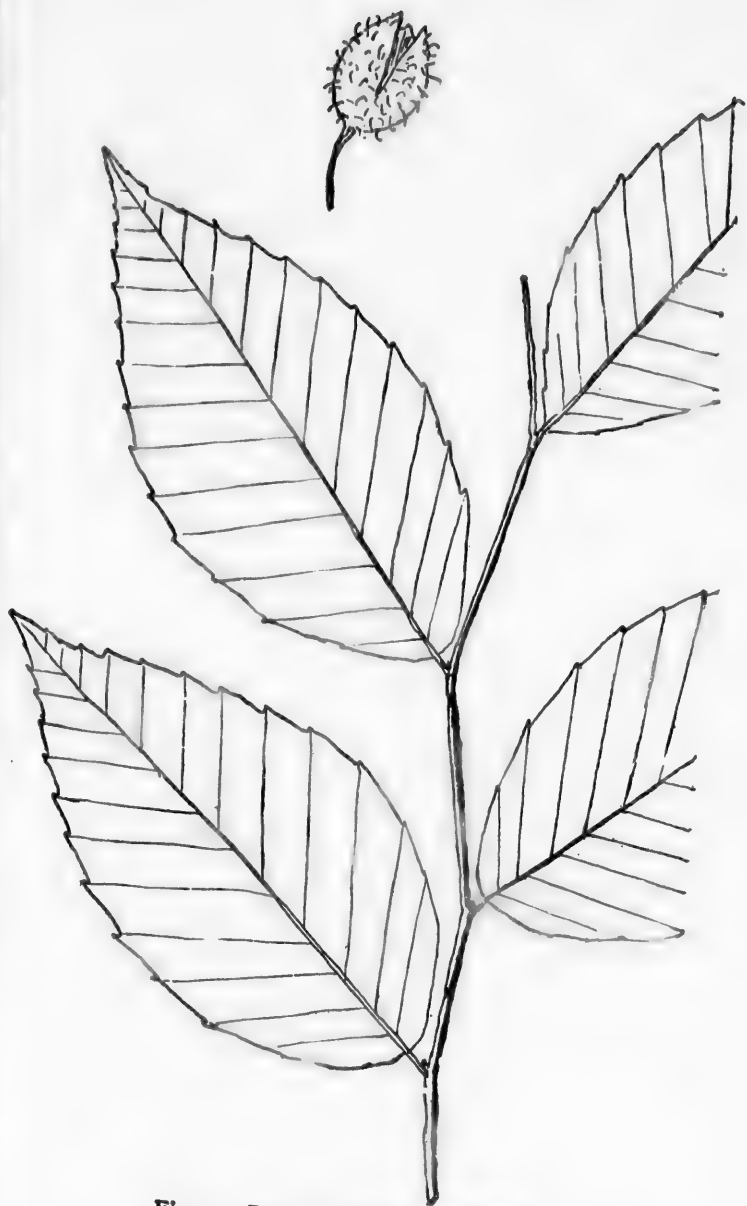


Fig. 35.—Beech. (*F. ferruginea*, Ait.)
NATURAL SIZE.

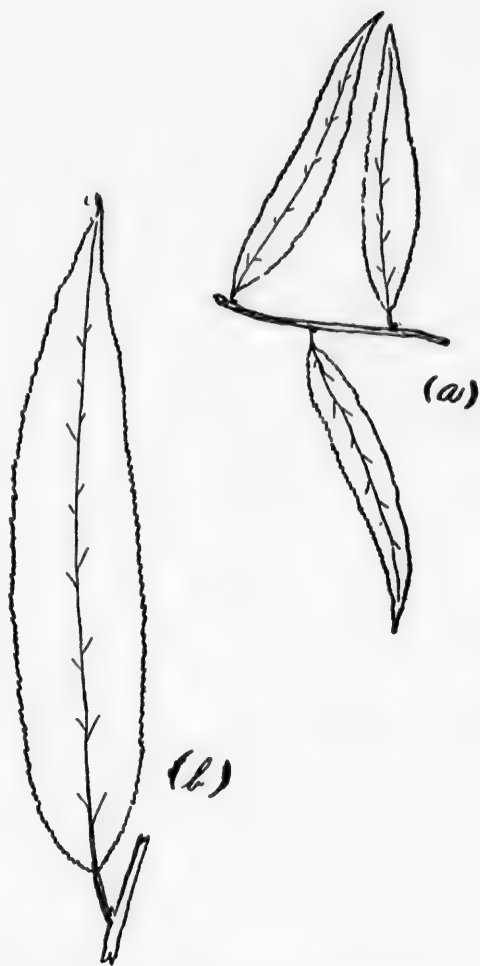


Fig. 36.—Black Willow. (*S. nigra*, Marsh.)
a. Commonest form. b. Large form.
NATURAL SIZE.



Fig.

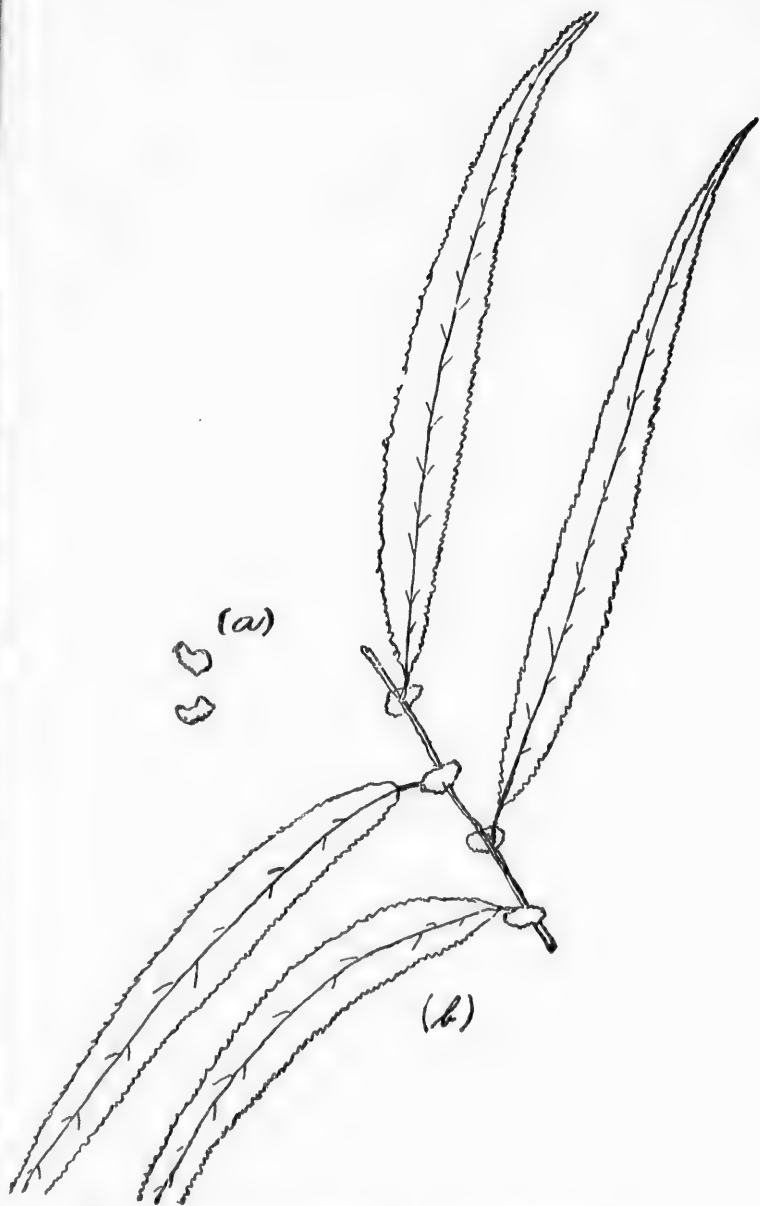


Fig. 37.—Scythe-leaved Willow. (*S. n.*, var. *falcata*, Torr.)

a. Stipules. *b.* Leaves.

NATURAL SIZE.





Fig. 38.—Shining Willow. (*S. lucida*, Muhl.)
NATURAL SIZE.



Fig. 39.—Long-beaked Willow. (*S. rostrata*, Richards.)
NATURAL SIZE.

Fig.



Fig. 4



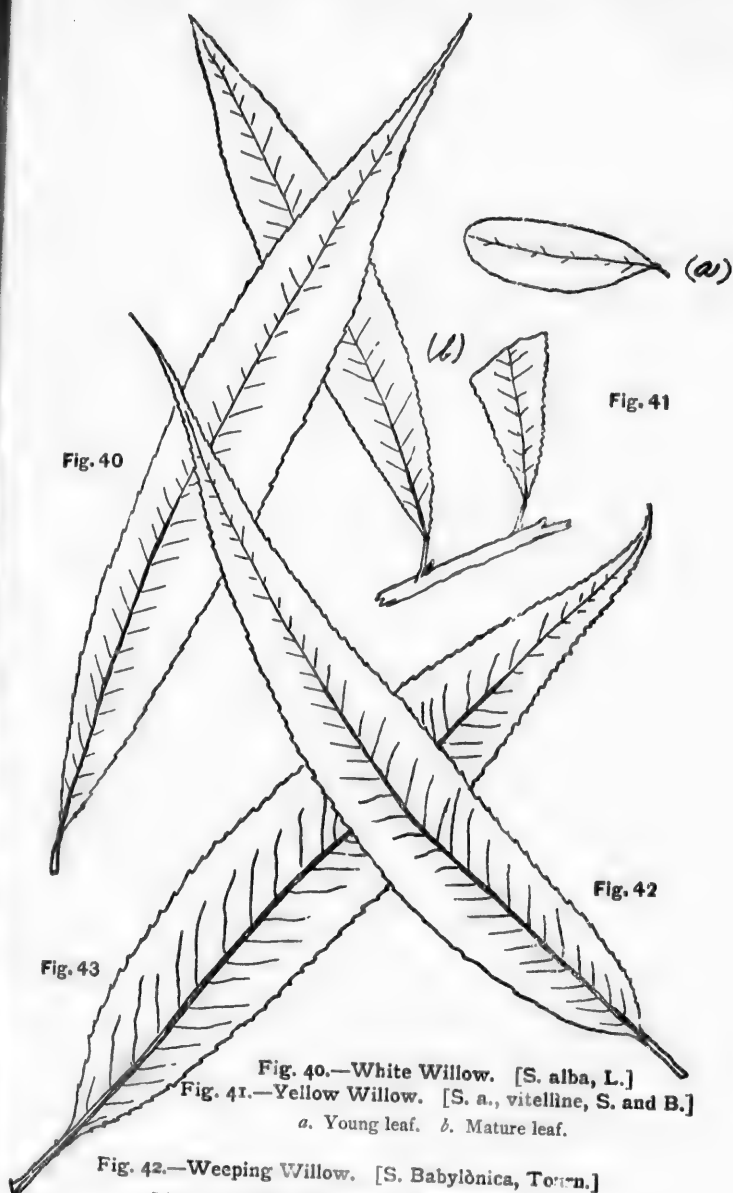


Fig. 40.—White Willow. [*S. alba*, L.]

Fig. 41.—Yellow Willow. [*S. a.*, vitellina, S. and B.]

a. Young leaf. b. Mature leaf.

Fig. 42.—Weeping Willow. [*S. Babylónica*, Torr.]

Fig. 43.—Crack Willow. [*S. fragilis*, L.]

NATURAL SIZE.

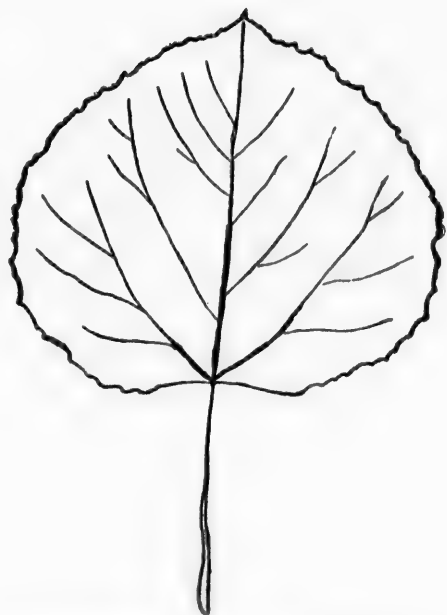


Fig. 44.—Aspen. (*P. tremuloides*, Michx.)
NATURAL SIZE.

Fig

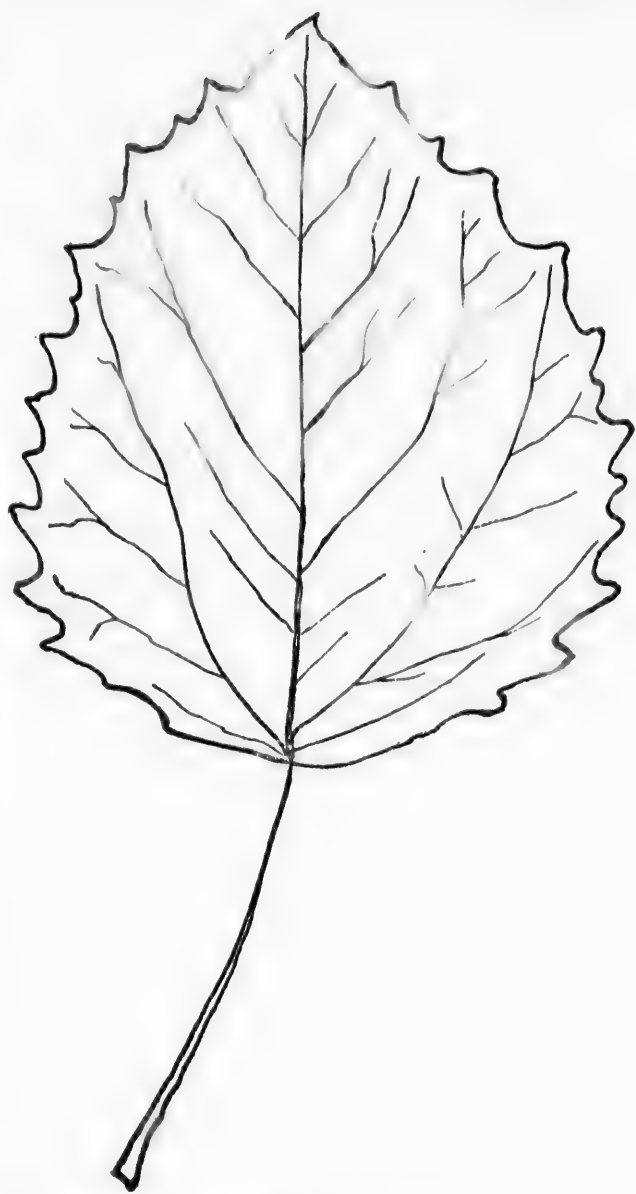
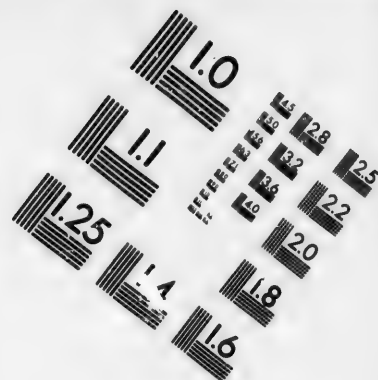


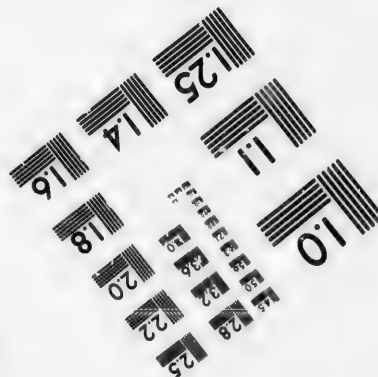
Fig. 45.—Large Toothed Aspen. (*P. grandidentata*, Michx.)
NATURAL SIZE.





A resolution test chart featuring various patterns of horizontal and vertical lines of increasing frequency. Each pattern is accompanied by a numerical value indicating its resolution. The values include 1.0, 1.1, 1.25, 1.4, 1.6, 1.8, 2.0, 2.2, 2.5, 2.8, 3.2, 3.6, 4.0, 4.5, 5.0, 5.6, 6.3, 7.1, 8.0, 9.0, 10, 11.2, 12.5, 14, 16, 18, 20, 22.5, 25, 28, 32, 36, 40, 45, 50, 56, 63, 71, 80, 90, 100, 112, 125, 140, 160, 180, 200, 225, 250, 280, 320, 360, 400, 450, 500, 560, 630, 710, 800, 900, 1000, 1120, 1250, 1400, 1600, 1800, 2000, 2250, 2500, 2800, 3200, 3600, 4000, 4500, 5000, 5600, 6300, 7100, 8000, 9000, 10000, 11200, 12500, 14000, 16000, 18000, 20000, 22500, 25000, 28000, 32000, 36000, 40000, 45000, 50000, 56000, 63000, 71000, 80000, 90000, 100000, 112000, 125000, 140000, 160000, 180000, 200000, 225000, 250000, 280000, 320000, 360000, 400000, 450000, 500000, 560000, 630000, 710000, 800000, 900000, 1000000, 1120000, 1250000, 1400000, 1600000, 1800000, 2000000, 2250000, 2500000, 2800000, 3200000, 3600000, 4000000, 4500000, 5000000, 5600000, 6300000, 7100000, 8000000, 9000000, 10000000, 11200000, 12500000, 14000000, 16000000, 18000000, 20000000, 22500000, 25000000, 28000000, 32000000, 36000000, 40000000, 45000000, 50000000, 56000000, 63000000, 71000000, 80000000, 90000000, 100000000, 112000000, 125000000, 140000000, 160000000, 180000000, 200000000, 225000000, 250000000, 280000000, 320000000, 360000000, 400000000, 450000000, 500000000, 560000000, 630000000, 710000000, 800000000, 900000000, 1000000000, 1120000000, 1250000000, 1400000000, 1600000000, 1800000000, 2000000000, 2250000000, 2500000000, 2800000000, 3200000000, 3600000000, 4000000000, 4500000000, 5000000000, 5600000000, 6300000000, 7100000000, 8000000000, 9000000000, 10000000000, 11200000000, 12500000000, 14000000000, 16000000000, 18000000000, 20000000000, 22500000000, 25000000000, 28000000000, 32000000000, 36000000000, 40000000000, 45000000000, 50000000000, 56000000000, 63000000000, 71000000000, 80000000000, 90000000000, 100000000000, 112000000000, 125000000000, 140000000000, 160000000000, 180000000000, 200000000000, 225000000000, 250000000000, 280000000000, 320000000000, 360000000000, 400000000000, 450000000000, 500000000000, 560000000000, 630000000000, 710000000000, 800000000000, 900000000000, 1000000000000, 1120000000000, 1250000000000, 1400000000000, 1600000000000, 1800000000000, 2000000000000, 2250000000000, 2500000000000, 2800000000000, 3200000000000, 3600000000000, 4000000000000, 4500000000000, 5000000000000, 5600000000000, 6300000000000, 7100000000000, 8000000000000, 9000000000000, 10000000000000, 11200000000000, 12500000000000, 14000000000000, 16000000000000, 18000000000000, 20000000000000, 22500000000000, 25000000000000, 28000000000000, 32000000000000, 36000000000000, 40000000000000, 45000000000000, 50000000000000, 56000000000000, 63000000000000, 71000000000000, 80000000000000, 90000000000000, 100000000000000, 112000000000000, 125000000000000, 140000000000000, 160000000000000, 180000000000000, 200000000000000, 225000000000000, 250000000000000, 280000000000000, 320000000000000, 360000000000000, 400000000000000, 450000000000000, 500000000000000, 560000000000000, 630000000000000, 710000000000000, 800000000000000, 900000000000000, 1000000000000000, 1120000000000000, 1250000000000000, 1400000000000000, 1600000000000000, 1800000000000000, 2000000000000000, 2250000000000000, 2500000000000000, 2800000000000000, 3200000000000000, 3600000000000000, 4000000000000000, 4500000000000000, 5000000000000000, 5600000000000000, 6300000000000000, 7100000000000000, 8000000000000000, 9000000000000000, 10000000000000000, 11200000000000000, 12500000000000000, 14000000000000000, 16000000000000000, 18000000000000000, 20000000000000000, 22500000000000000, 25000000000000000, 28000000000000000, 32000000000000000, 36000000000000000, 40000000000000000, 45000000000000000, 50000000000000000, 56000000000000000, 63000000000000000, 71000000000000000, 80000000000000000, 90000000000000000, 100000000000000000, 112000000000000000, 125000000000000000, 140000000000000000, 160000000000000000, 180000000000000000, 200000000000000000, 225000000000000000, 250000000000000000, 280000000000000000, 320000000000000000, 360000000000000000, 400000000000000000,

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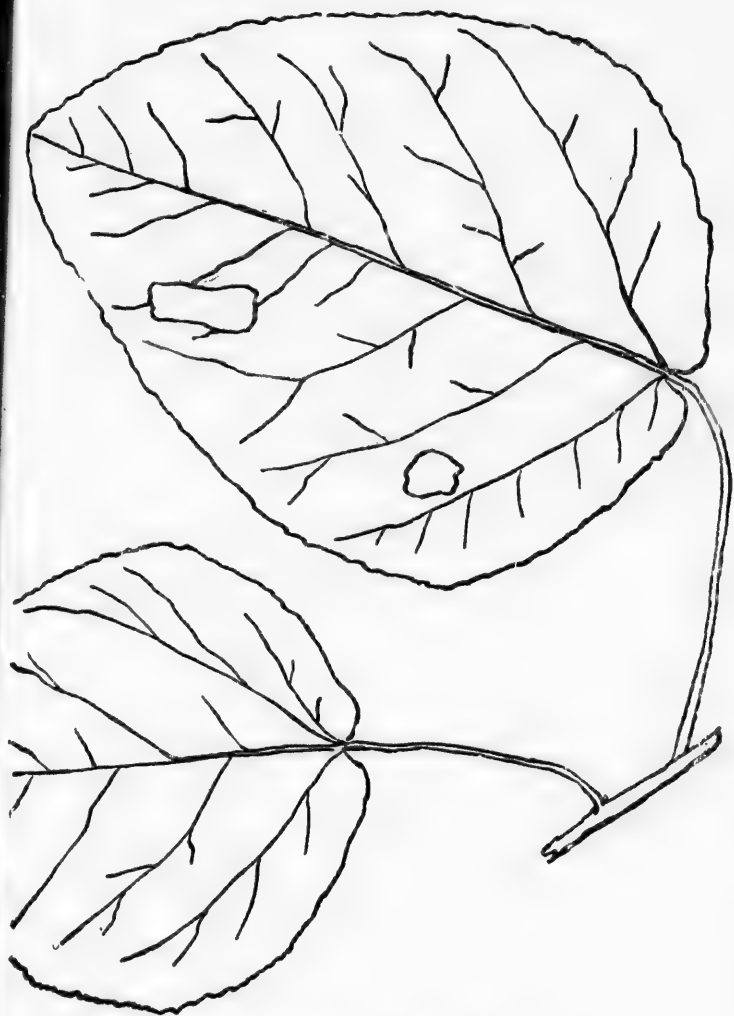


Fig. 46.—Downy-leaved Poplar. (*P. heterophylla*, L.)
NATURAL SIZE.

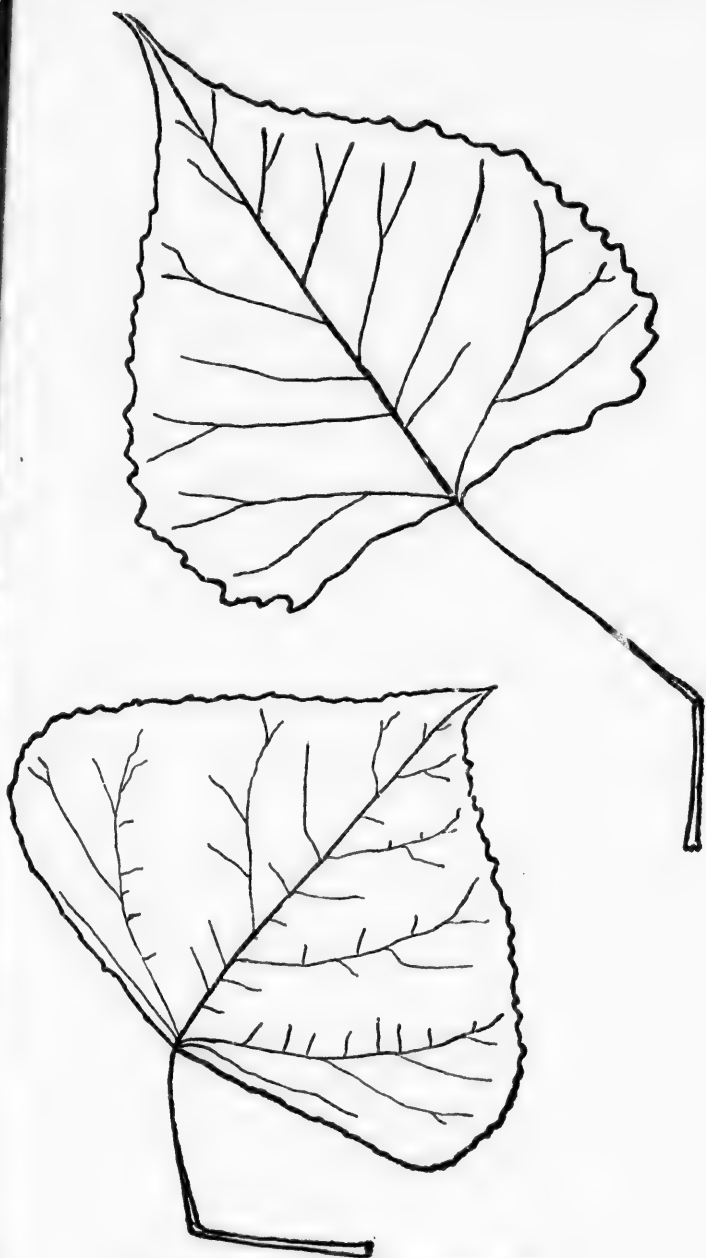


Fig. 47.—Cottonwood. (*P. monilifera*, Ait.)
NATURAL SIZE





Fig. 48

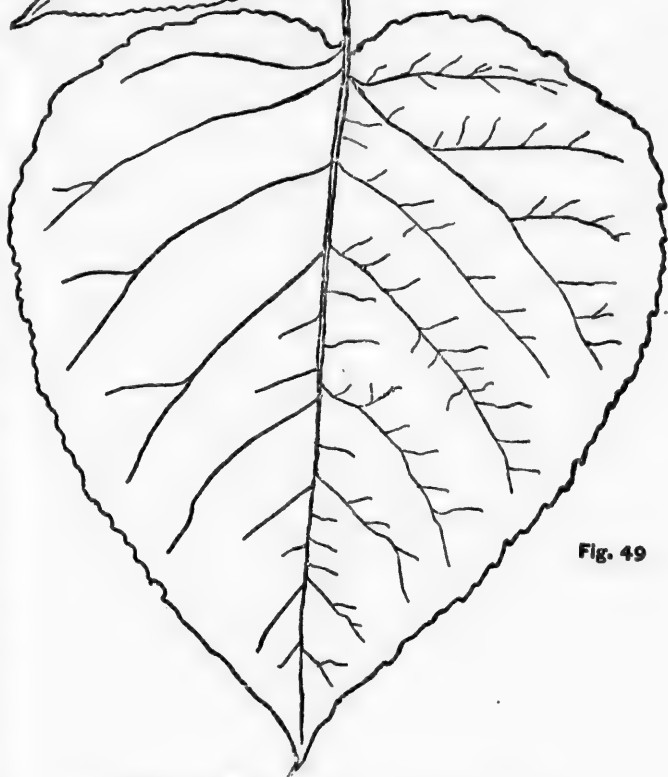


Fig. 49

Fig. 48.—Balsam Poplar. (*P. balsamifera*, L.)
Fig. 49.—Balm of Gilead. *P. b. candicans* (Ait.), Gray.
NATURAL SIZE.

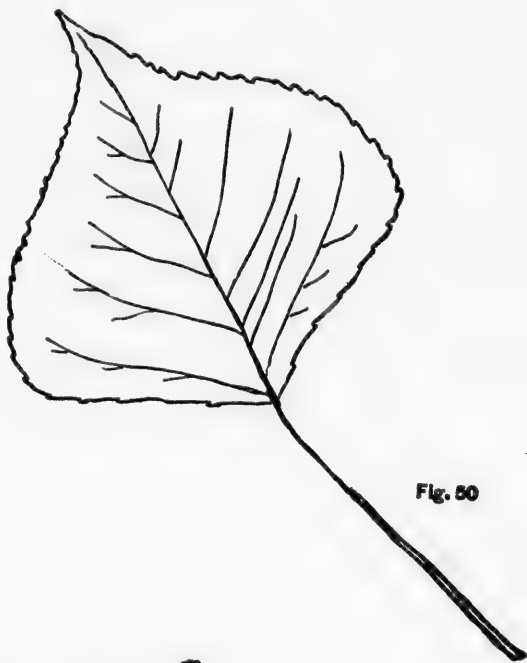


Fig. 50



Fig. 51

Fig. 50.—Lombardy Poplar. [*P. dilatata*, Ait.]

Fig. 51.—Silver-Leaf Poplar. [*P. alba*, L.]

NATURAL SIZE.



TREES WITH SIMPLE LEAVES
LEAVES ALTERNATE

CONTINUED

(EDGE LOBED)

A III

(a) and (b)



Fig. 52.—Tulip Tree. (*L.*, *tulipifera*, *L.*)
NATURAL SIZE.



Fig. 53.—White Oak. (*Q. alba*, L.)
LEAVES AND FRUIT REDUCED ONE FOURTH.

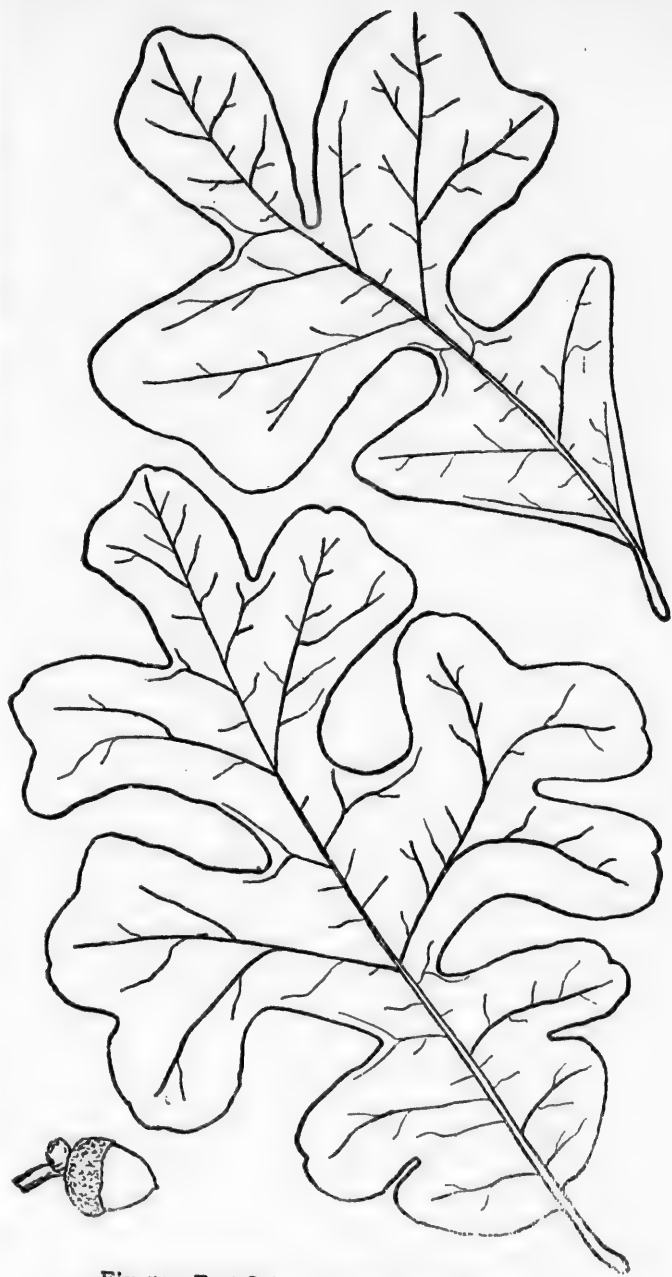


Fig. 54.—Post Oak. *Q. minor* (Marsh), Sarg.
LEAVES AND FRUIT REDUCED ONE FOURTH.





Fig. 55.—Burr Oak. (*Q. macrocarpa*, Michx.)
LEAVES AND FRUIT REDUCED ONE FOURTH.



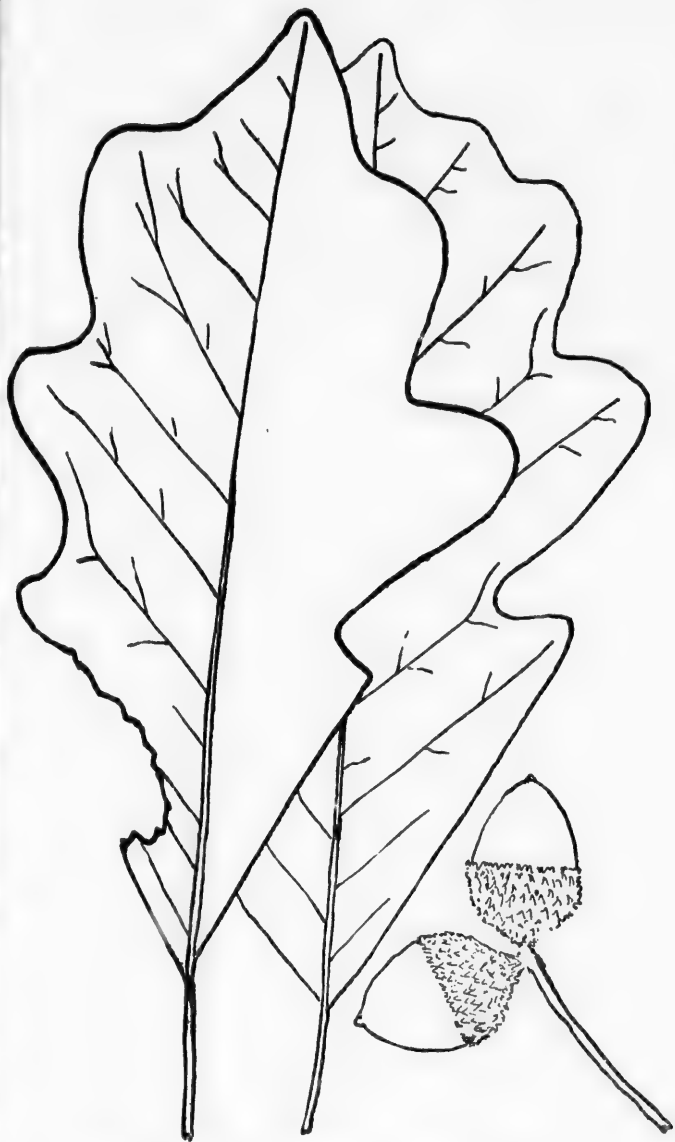


Fig. 56.—Swamp White Oak. (*Q. bicolor*, Willd.)
NATURAL SIZE.

10

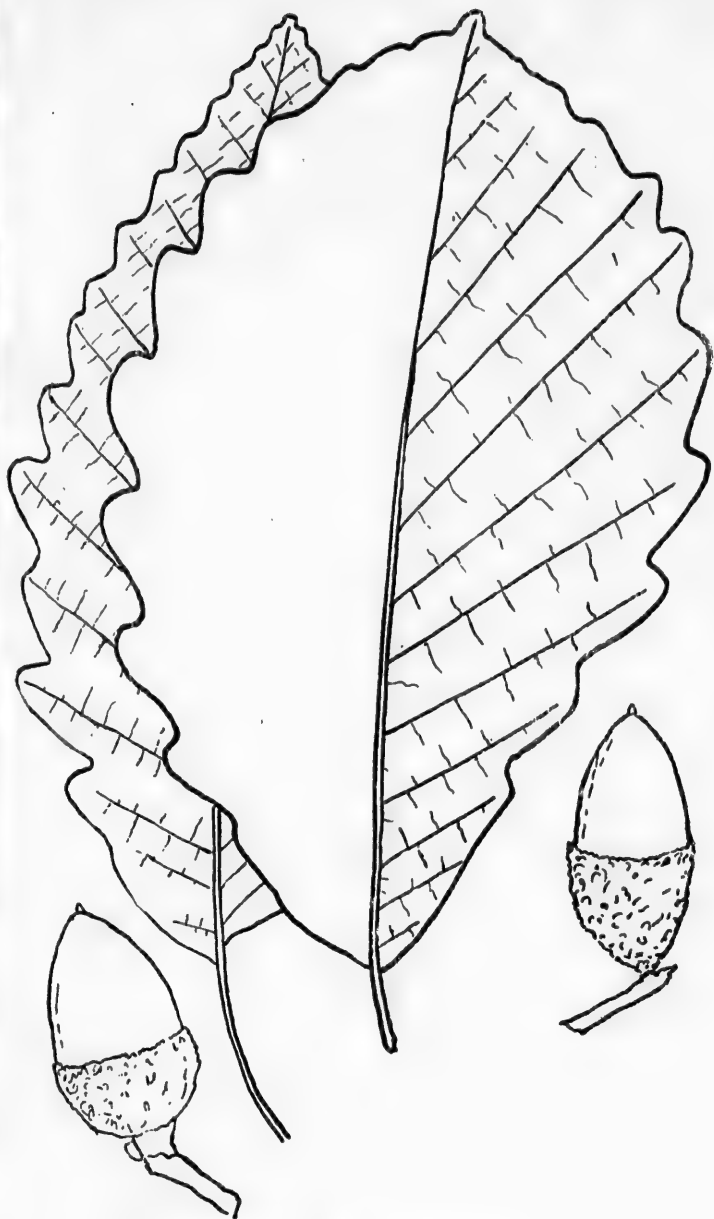
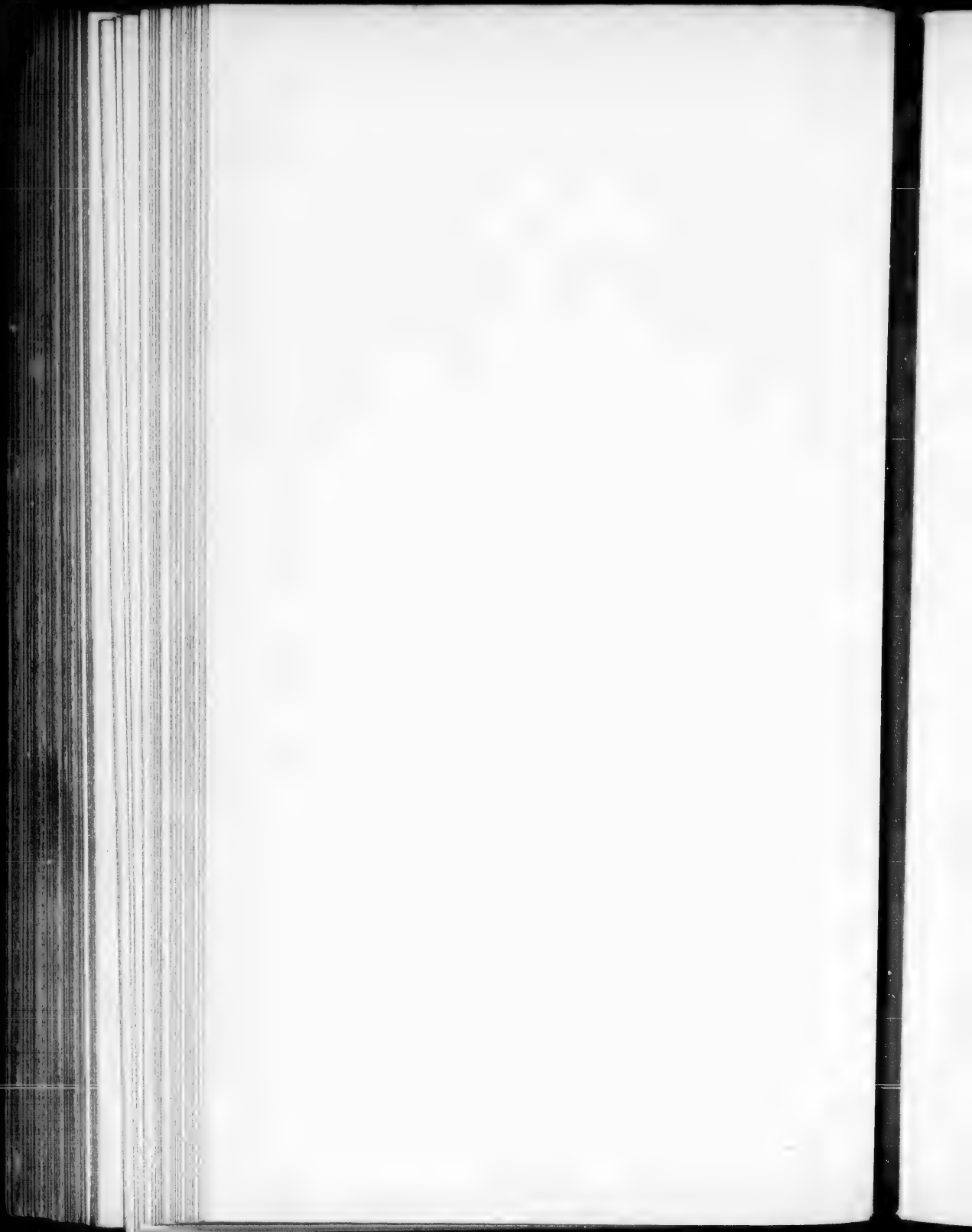


Fig. 57.—Chestnut Oak. (*Q. prinus*, L.)
NATURAL SIZE.



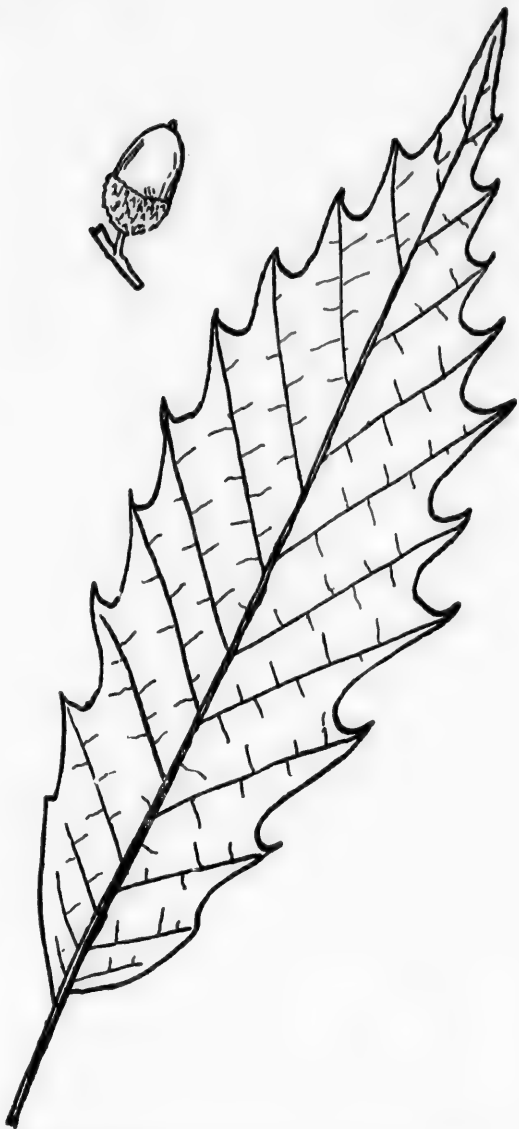


Fig. 58.—Yellow Chestnut Oak. *Q.* (Muhl.), Engelm.
NATURAL SIZE.



Fig. 59.—Black Jack. (*Q. nigra*, L.)
NATURAL SIZE.



Fig. 60.—Spanish Oak. (*Q. cuneata*, Wang.)
NATURAL SIZE.

11

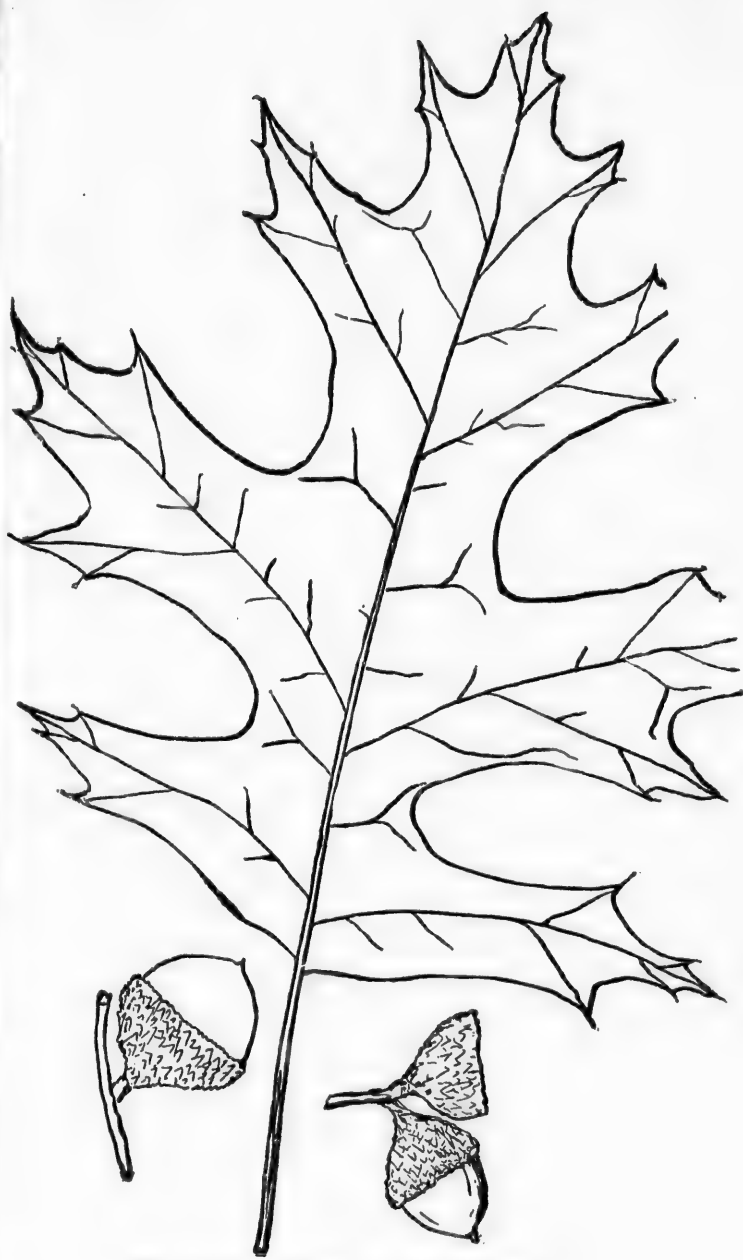


Fig. 61.—Scarlet Oak. (*Q. coccinea*, Wang.)
NATURAL SIZE.

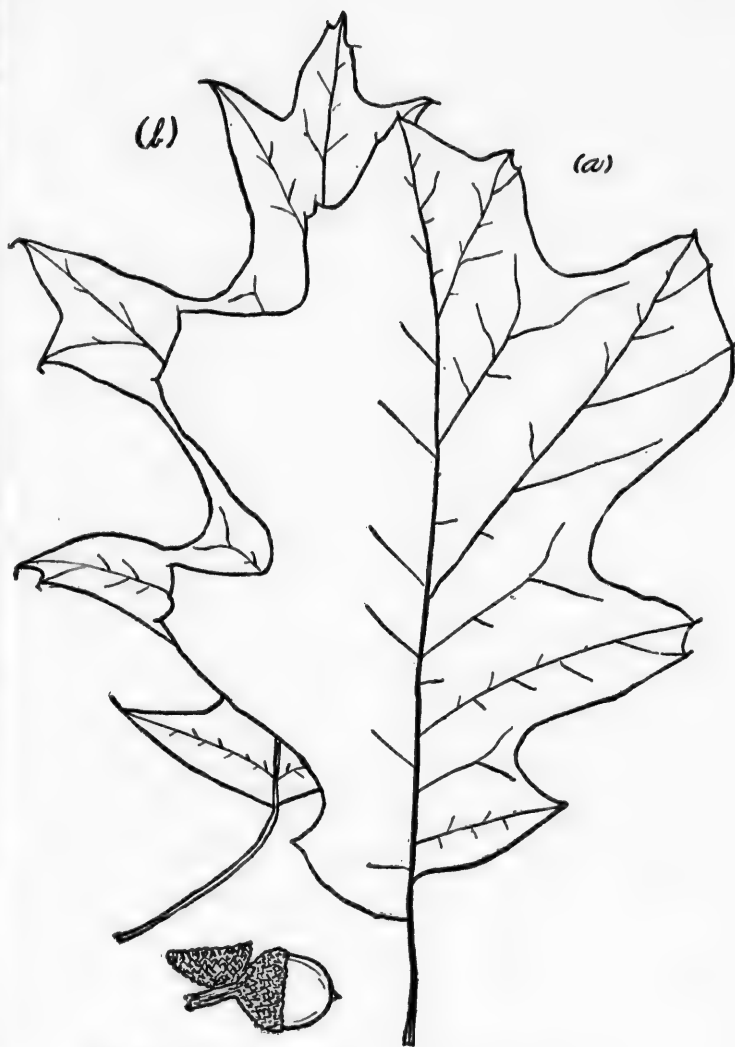


Fig. 62, *a* and *b*.—Black Oak. (*Q. c.*, *tinctoria*, Gray.)
FRUIT AND LEAVES REDUCED ONE FOURTH.





Fig. 63.—Red Oak. (*Q. rubra*, L.)
NATURAL SIZE.



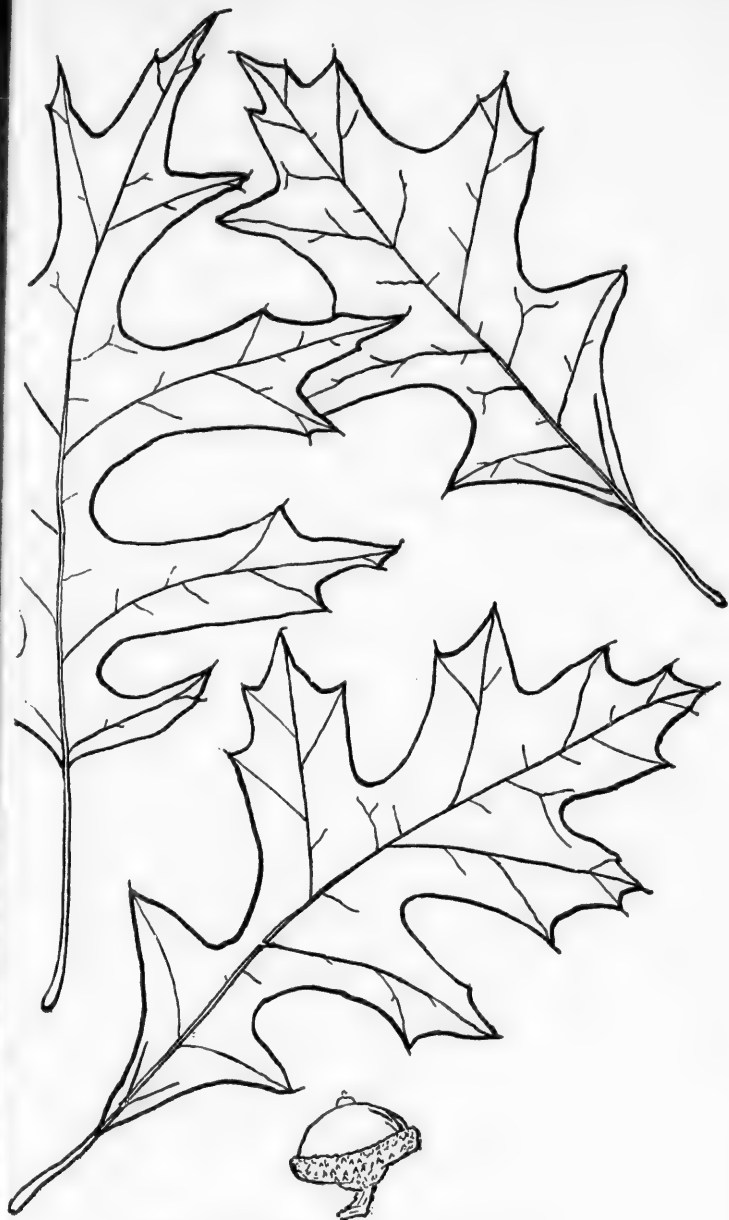


Fig. 64.—Pin Oak. (*Q. palustris*, D. Roi.)
NATURAL SIZE.



Fig. 65.—Willow Oak. (*Q. Phellos*, L.)
NATURAL SIZE.



Fig. 66.—Shingle Oak. (*Q. imbricaria*, Michx.)
NATURAL SIZE.

VI

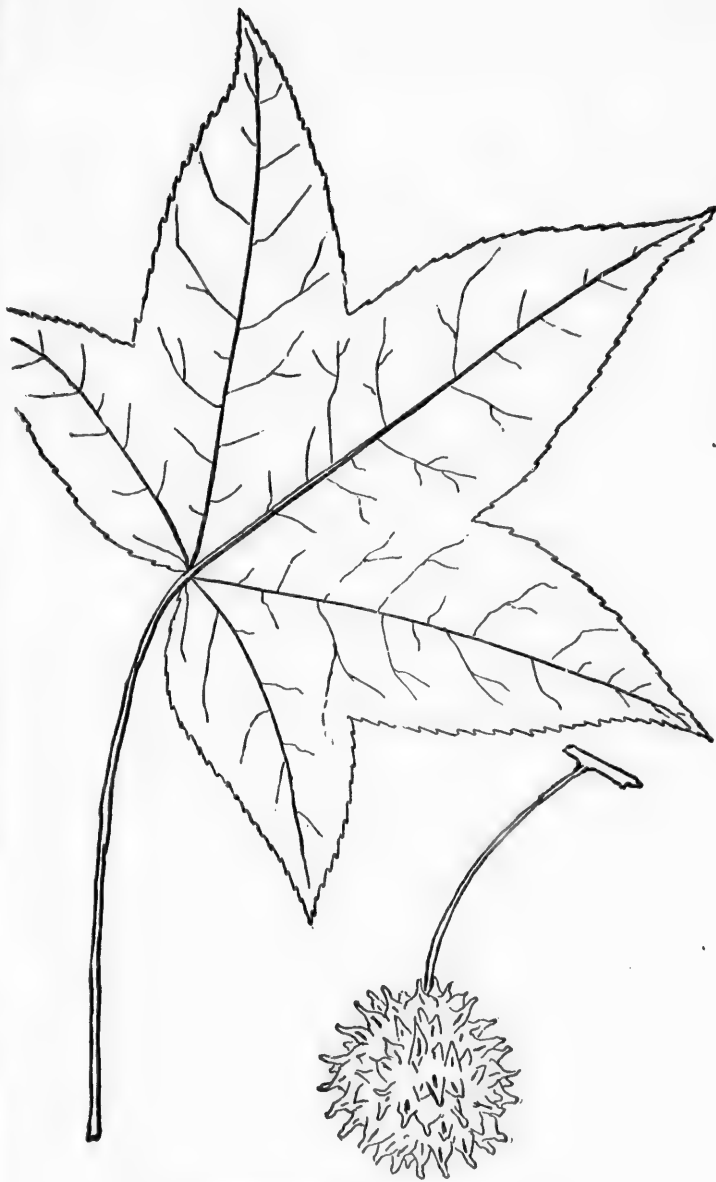


Fig. 67.—Sweet Gum. (*L. styraciflua*, L.)
NATURAL SIZE.

TREES WITH SIMPLE LEAVES

CONTINUED

LEAVES OPPOSITE

(EDGE ENTIRE)

B I





Fig. 68.—Flowering Dogwood. (*C. florida*, L.)
NATURAL SIZE.



Fig. 69.—Alternate-leaved Dogwood. (*C. alternifolia*, L. f.)
NATURAL SIZE.

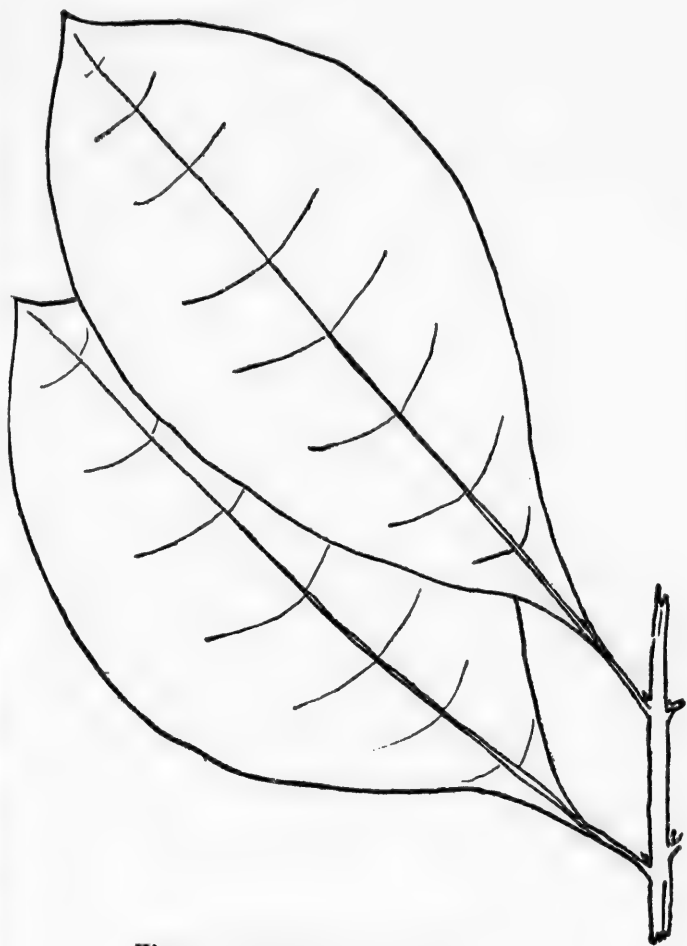


Fig. 70.—Fringe Tree. (*C. Virginica*, L.)
NATURAL SIZE.

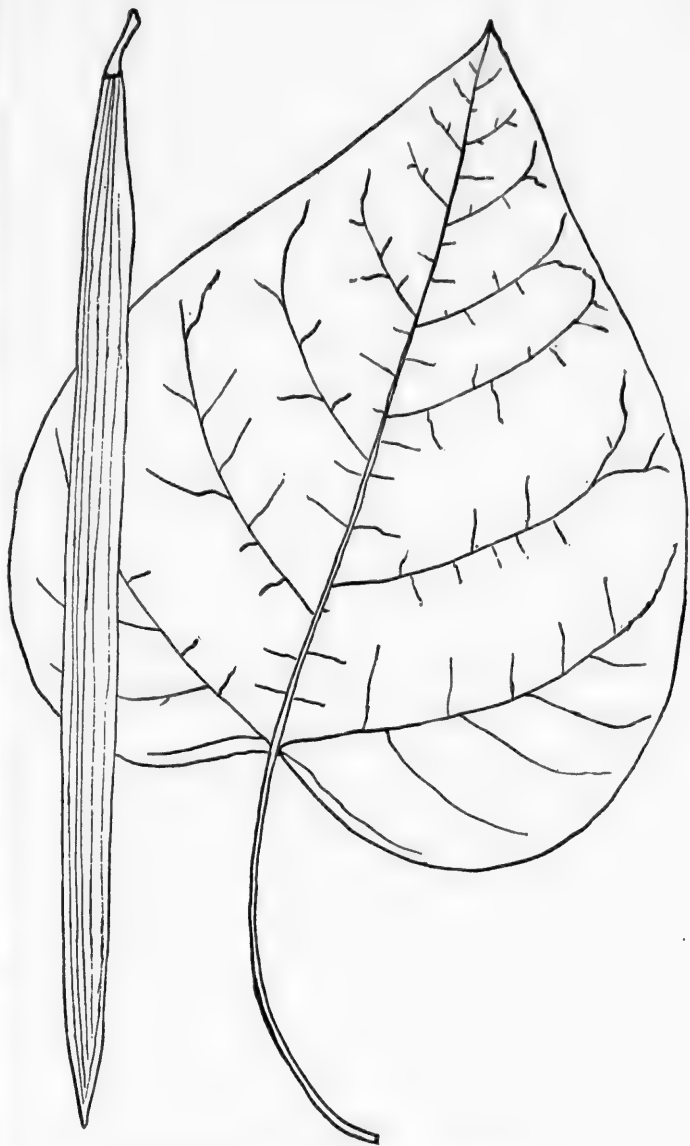


Fig. 71.—*Catalpa*. (*C. bignonioides*, Walt.)
LEAF AND FRUIT REDUCED ONE THIRD.

TREES WITH SIMPLE LEAVES

LEAVES OPPOSITE

CONTINUED

(EDGE TOOTHED)

B II

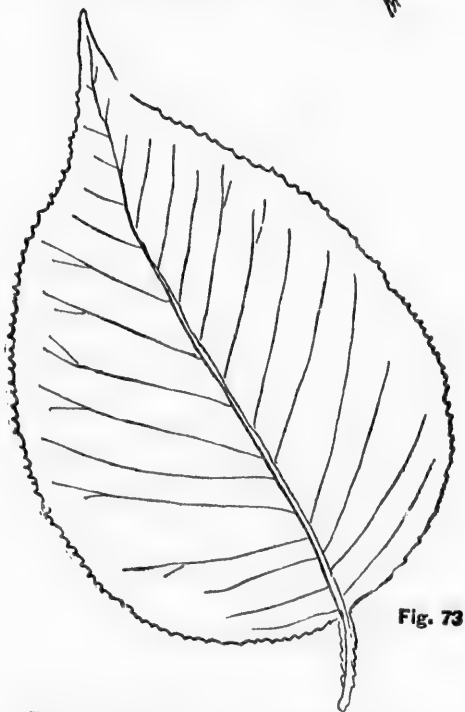
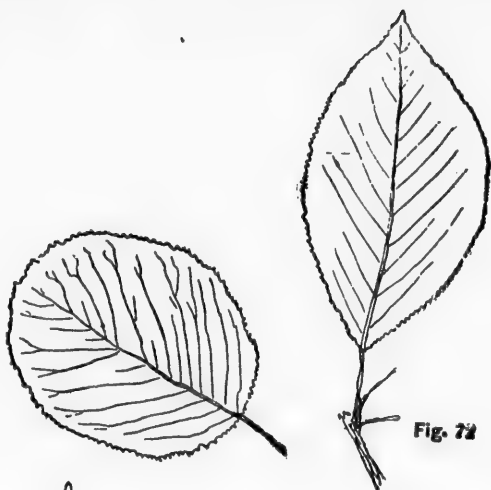


Fig. 72.—Black Haw. (*V. prunifolium*, L.)

Fig. 73.—Sweet Viburnum. (*V. lentago*, L.)

NATURAL SIZE.

TREES WITH SIMPLE LEAVES

LEAVES OPPOSITE

CONTINUED

(EDGE LOBED)

B III

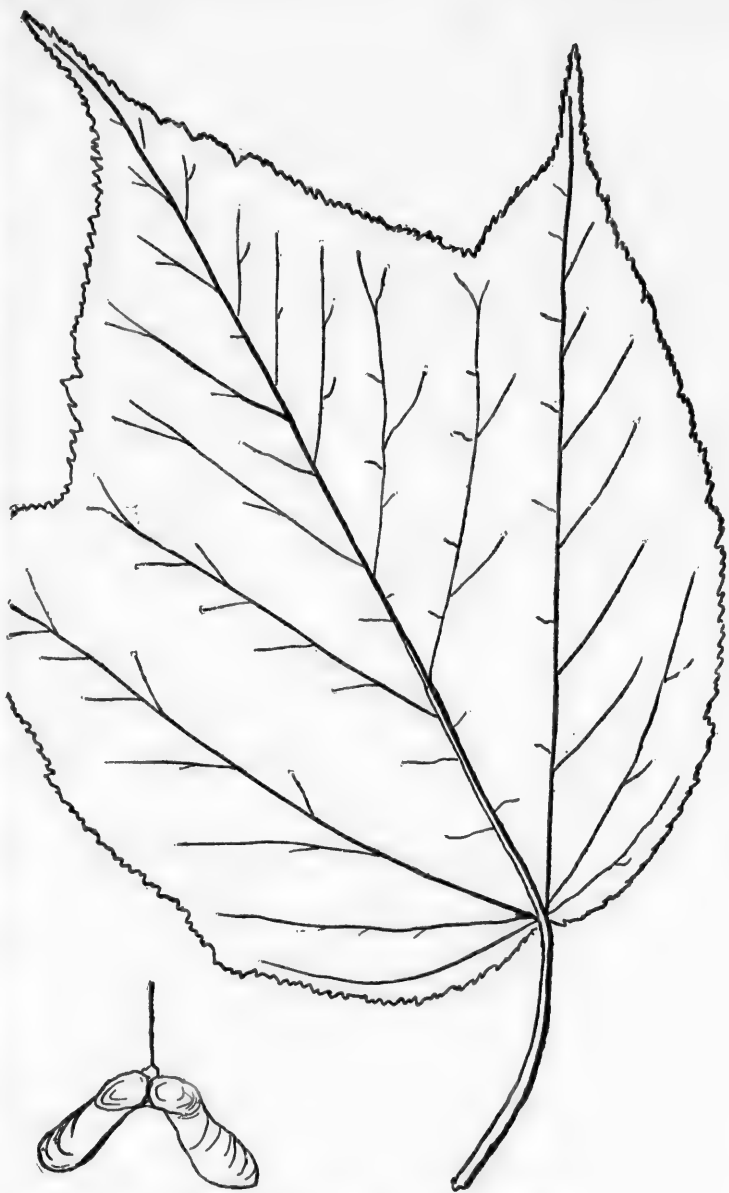


Fig. 74.—Striped Maple. (*A. Pennsylvanicum*, L.)
NATURAL SIZE.



Fig. 75.—Sugar Maple. (*A. saccharum*, Marsh.)
NATURAL SIZE.





Fig. 76.—Black Maple. (*A. s.*, var. *nigrum*.)
NATURAL SIZE.

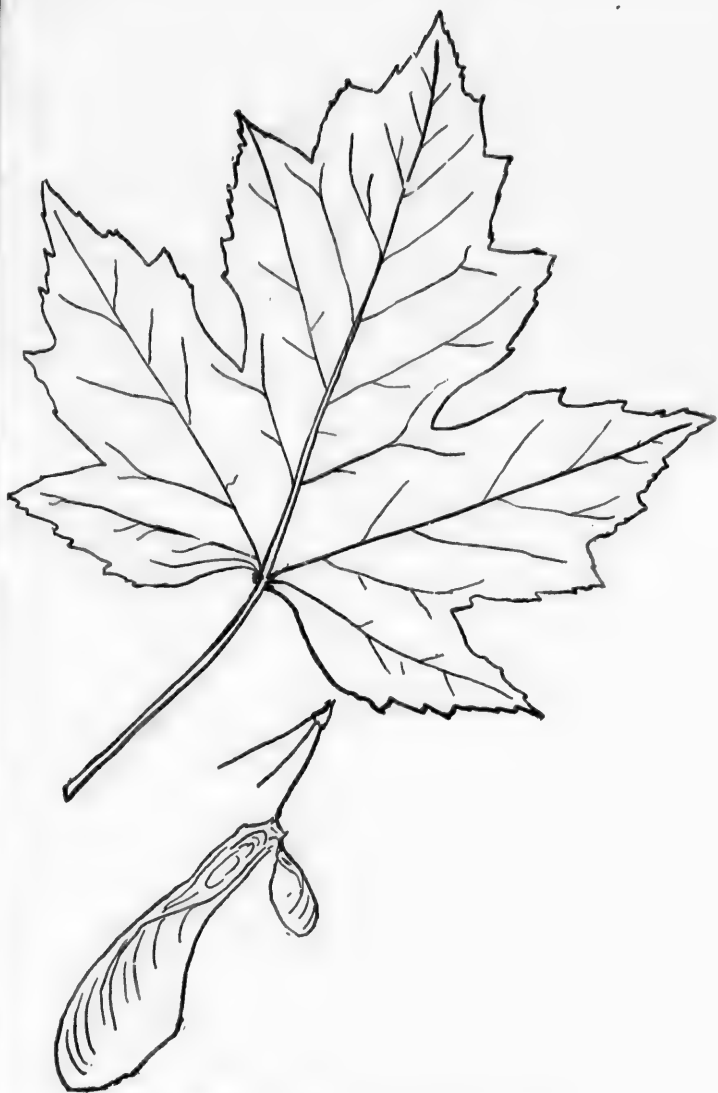


Fig. 77.—Silver-Leaf Maple. (*A. saccharinum*, L.)
NATURAL SIZE.

11

1



Fig. 78.—Red Maple. (*A. rubrum*, L.)
NATURAL SIZE.

TREES WITH SIMPLE LEAVES

CONTINUED

LEAVES INDETERMINATE

C 1





Fig. 79

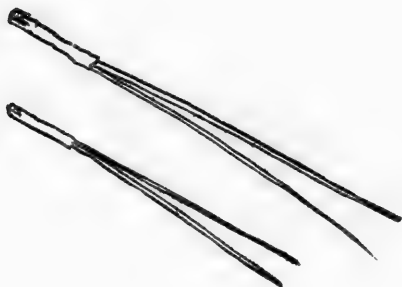


Fig. 80

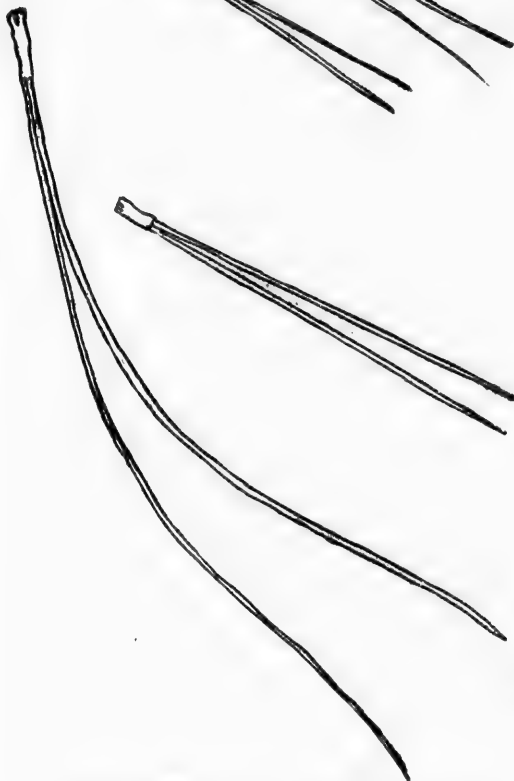


Fig. 81

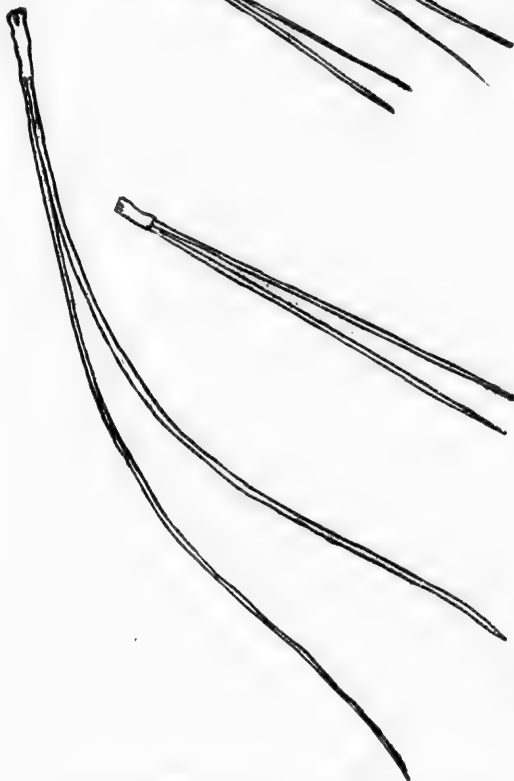


Fig. 82

Fig. 79.—Gray Pine. (*P. Banksiana*, Lam.)

Fig. 80.—Scrub Pine. (*P. Virginiana*, Mill.)

Fig. 81.—Table Mountain Pine. (*P. pungens*, Michx.)

Fig. 82.—Red Pine. (*P. resinosa*, Ait.)

NATURAL SIZE.

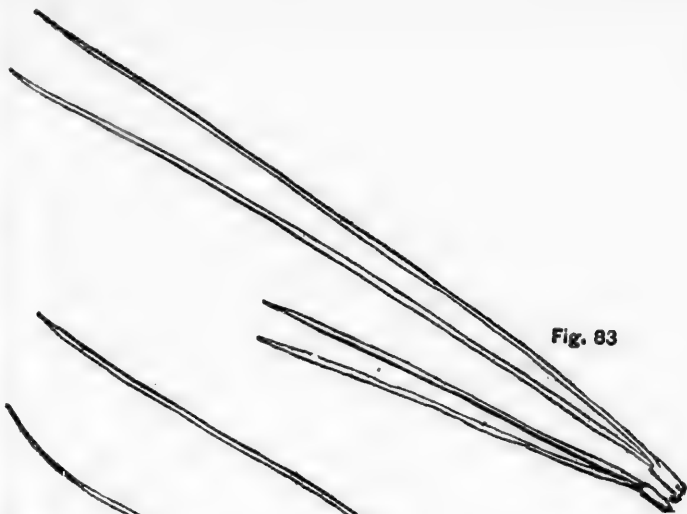


Fig. 83

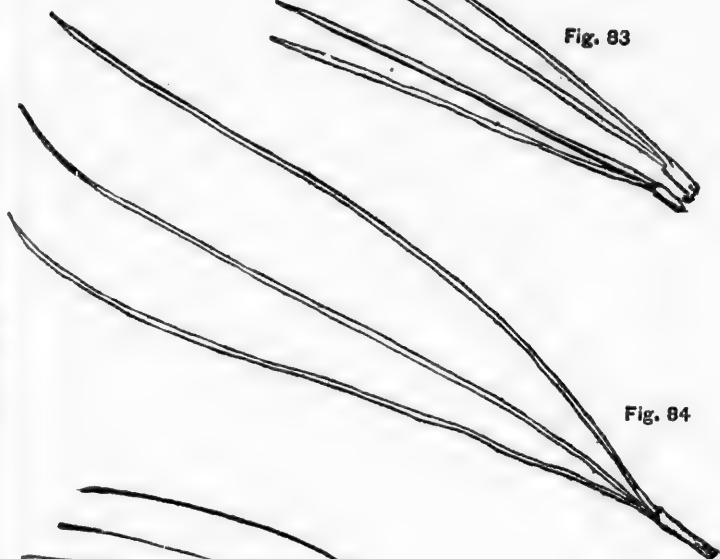


Fig. 84

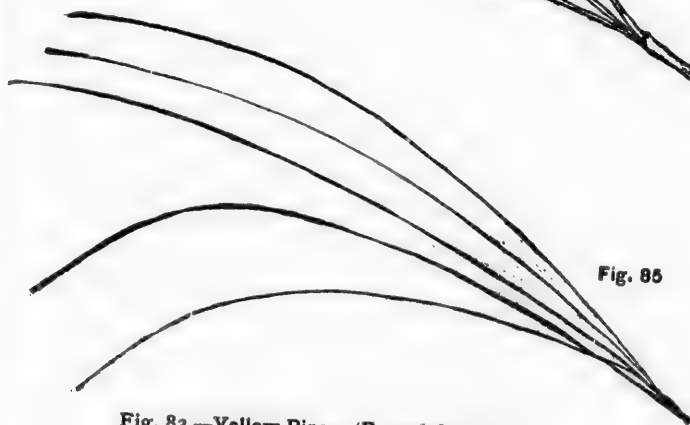


Fig. 85

Fig. 83.—Yellow Pine. (*P. ecpinata*, Mill.)

Fig. 84.—Pitch Pine. (*P. rigida*, Mill.)

Fig. 85.—White Pine. (*P. Strobus*, L.)

NATURAL SIZE



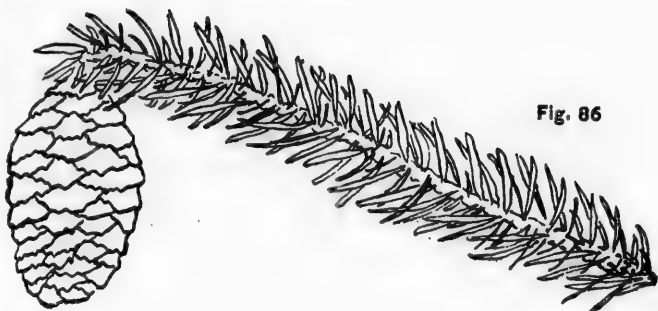
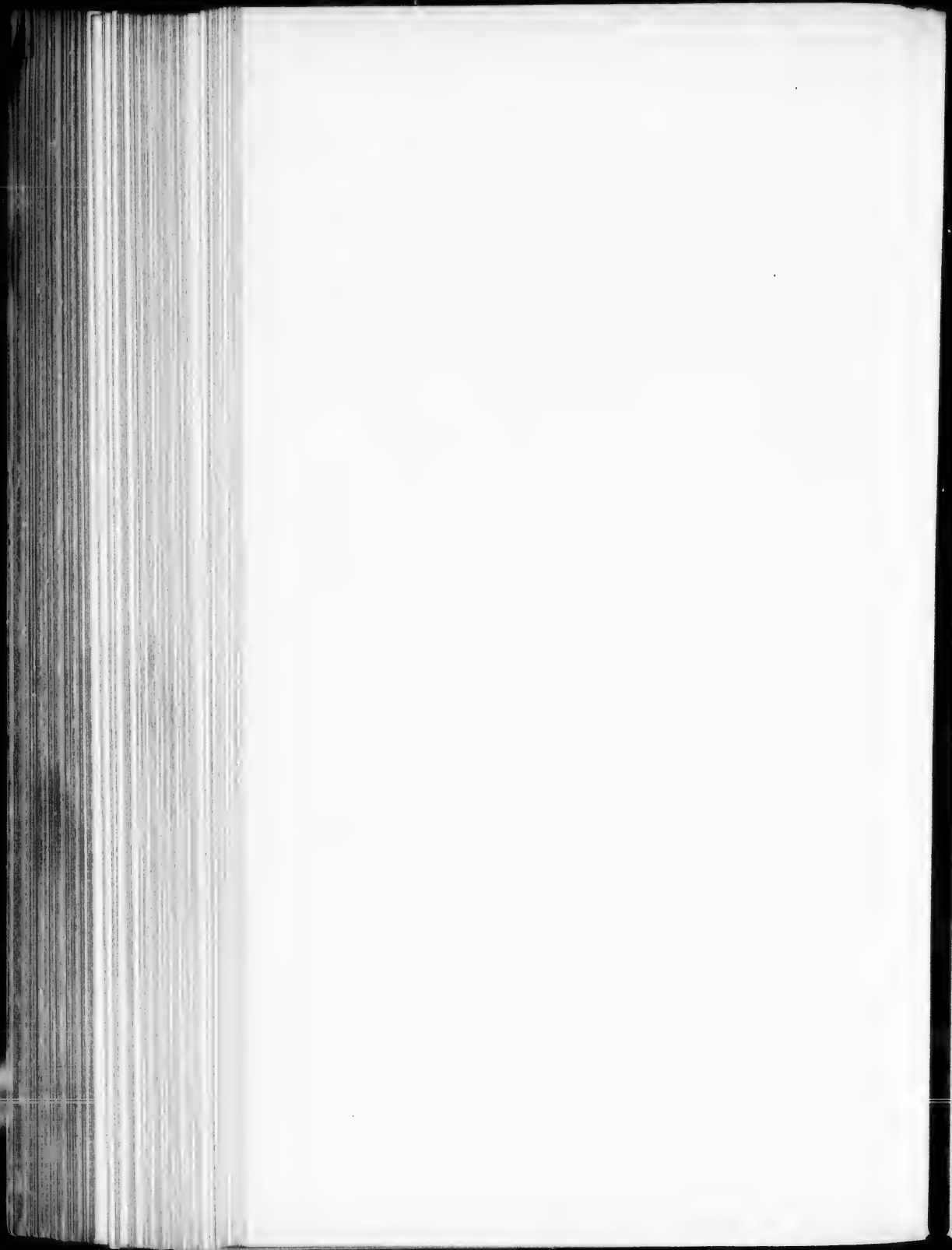


Fig. 86



Fig. 87

Fig. 86.—Black Spruce. *P. Mariana* (Mill), B. S. P.
 Fig. 87.—White Spruce. *P. Canadensis* (Mill), B. S. P.
 NATURAL SIZE.



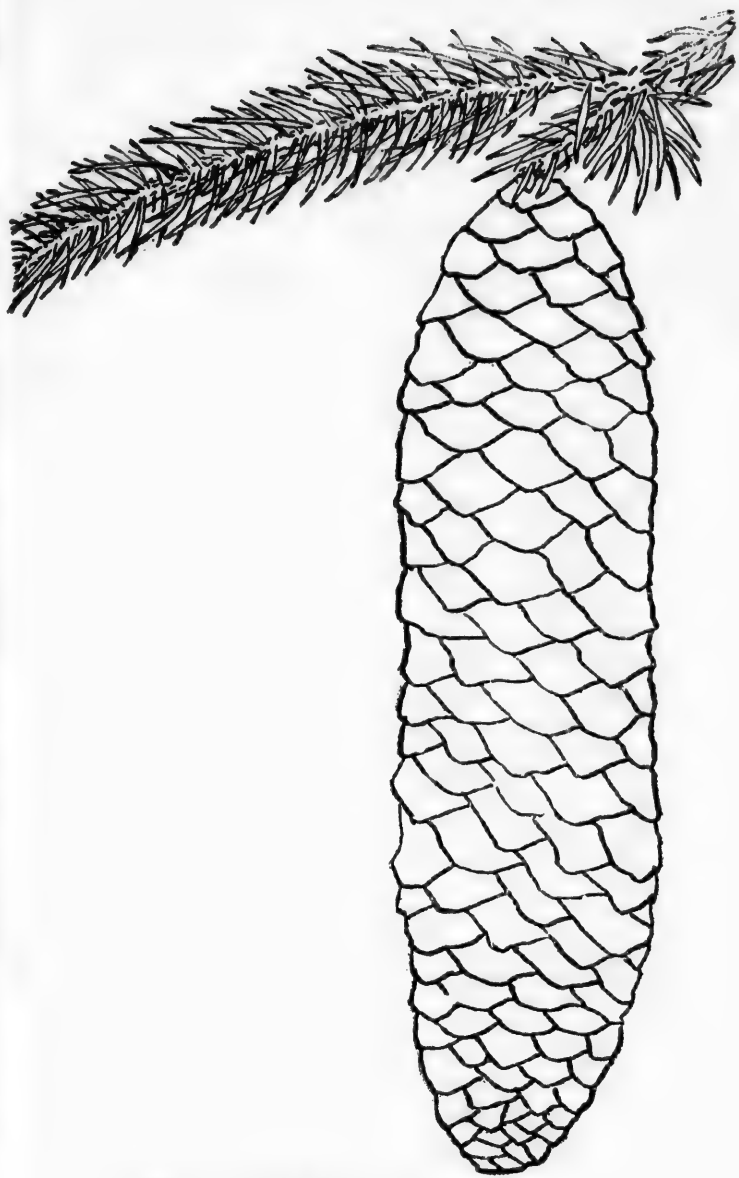


Fig. 88.—Norway Spruce. [*P. excelsa*.]
NATURAL SIZE.



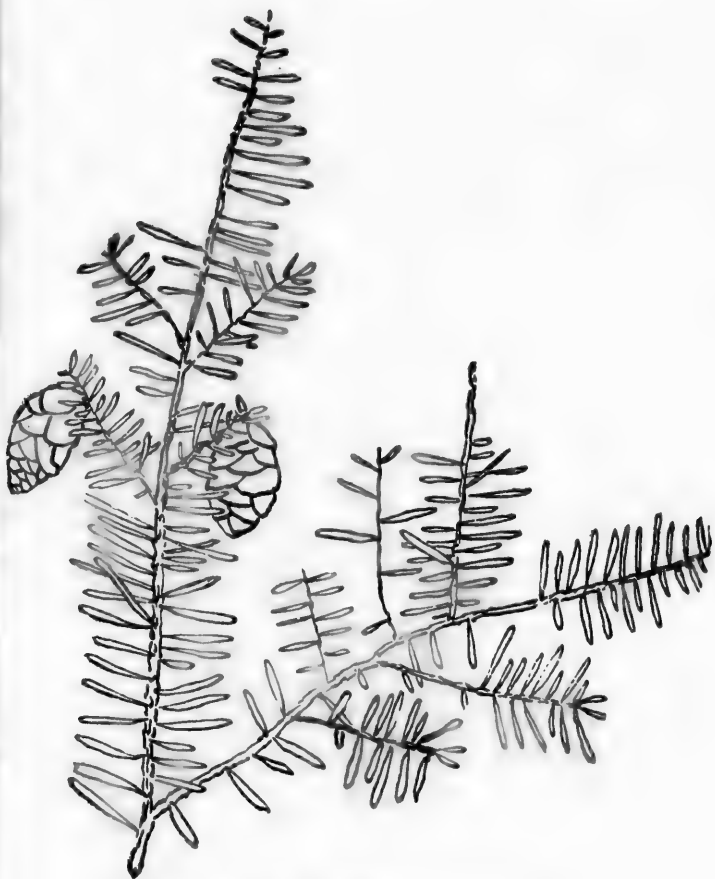


Fig. 89.—Hemlock. *T. Canadensis* (L.), Carr.
NATURAL SIZE.





Fig. 90

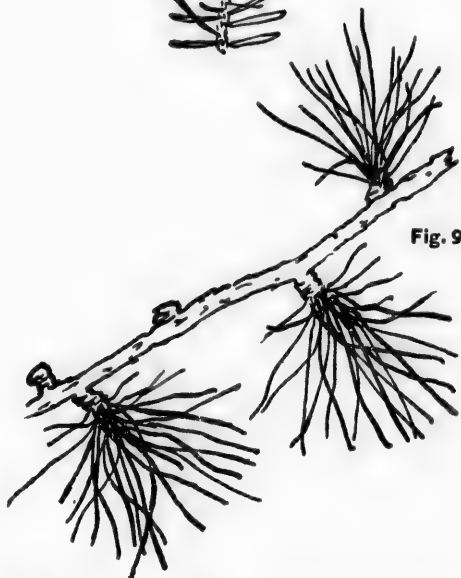


Fig. 91

Fig. 90.—Balsam Fir. *A. balsamea* (L.), Miller.
 Fig. 91.—Larch. *L. laricina* (Du Roi), Koch.
 NATURAL SIZE.

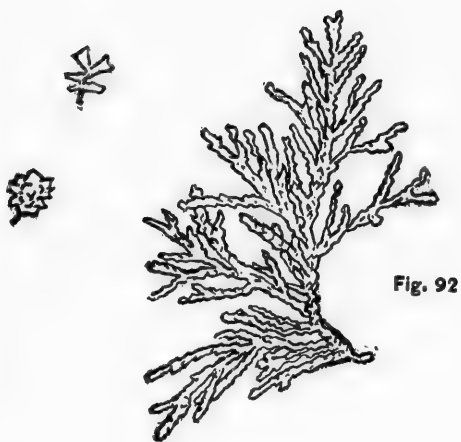


Fig. 92

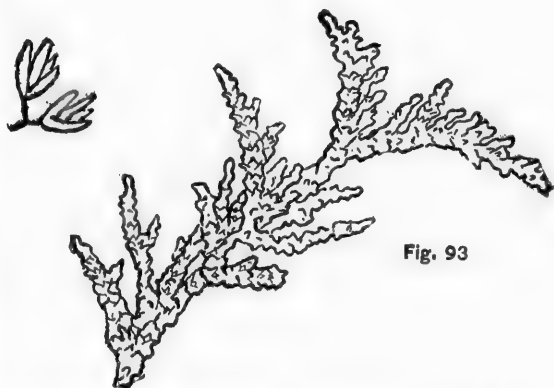


Fig. 93

Fig. 92.—White Cedar. *C. thyoides* (L.), B. S. P.

Fig. 93.—Arbor Vitæ. (*T. occidentalis*, L.)

NATURAL SIZE.





Fig. 94.—Red Cedar. (*J. Virginiana*, L.)
 a. Young. b. Old.
 NATURAL SIZE.

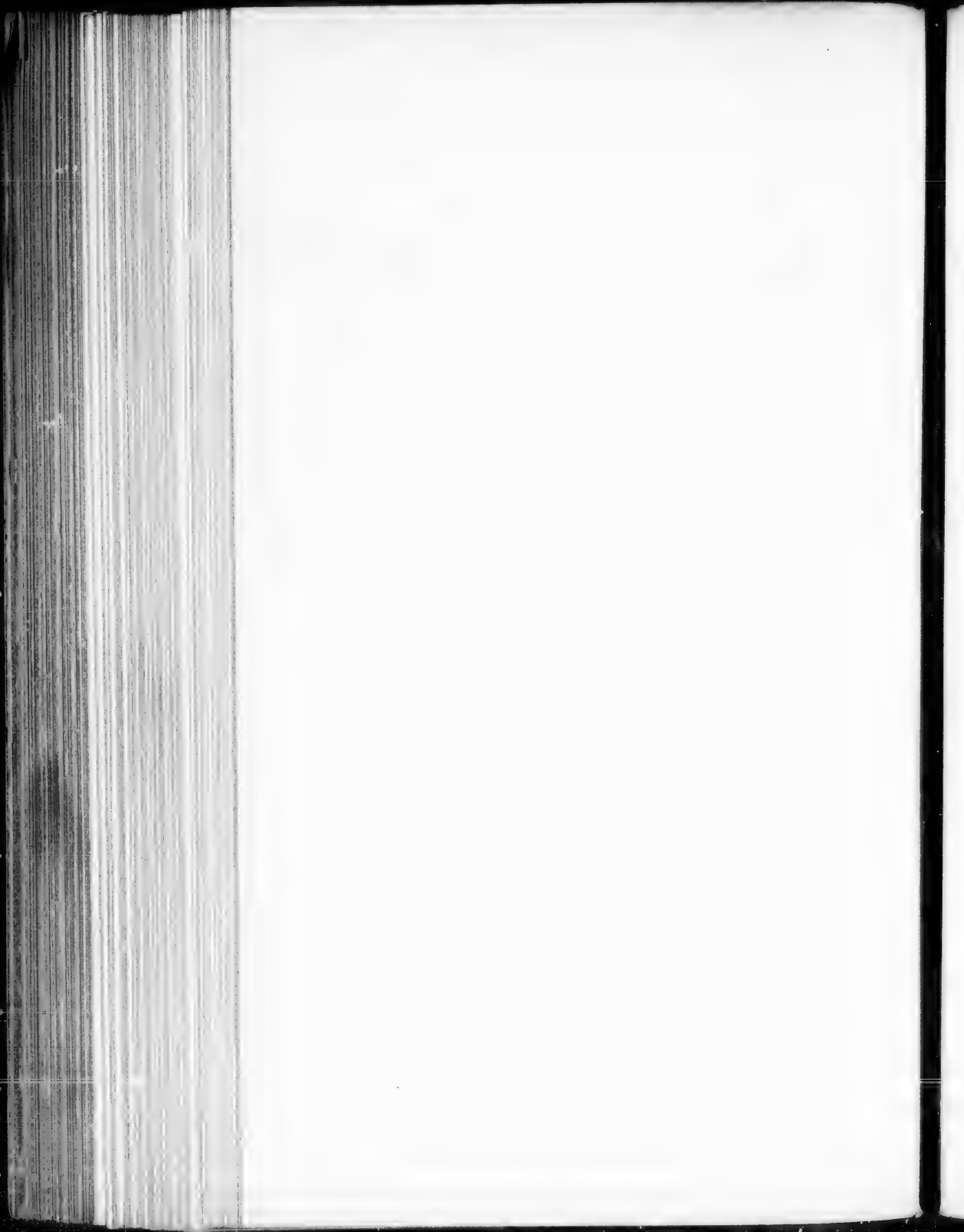


TREES WITH COMPOUND LEAVES
(FEATHER-SHAPED)

LEAVES ALTERNATE

(EDGE ENTIRE)

D I



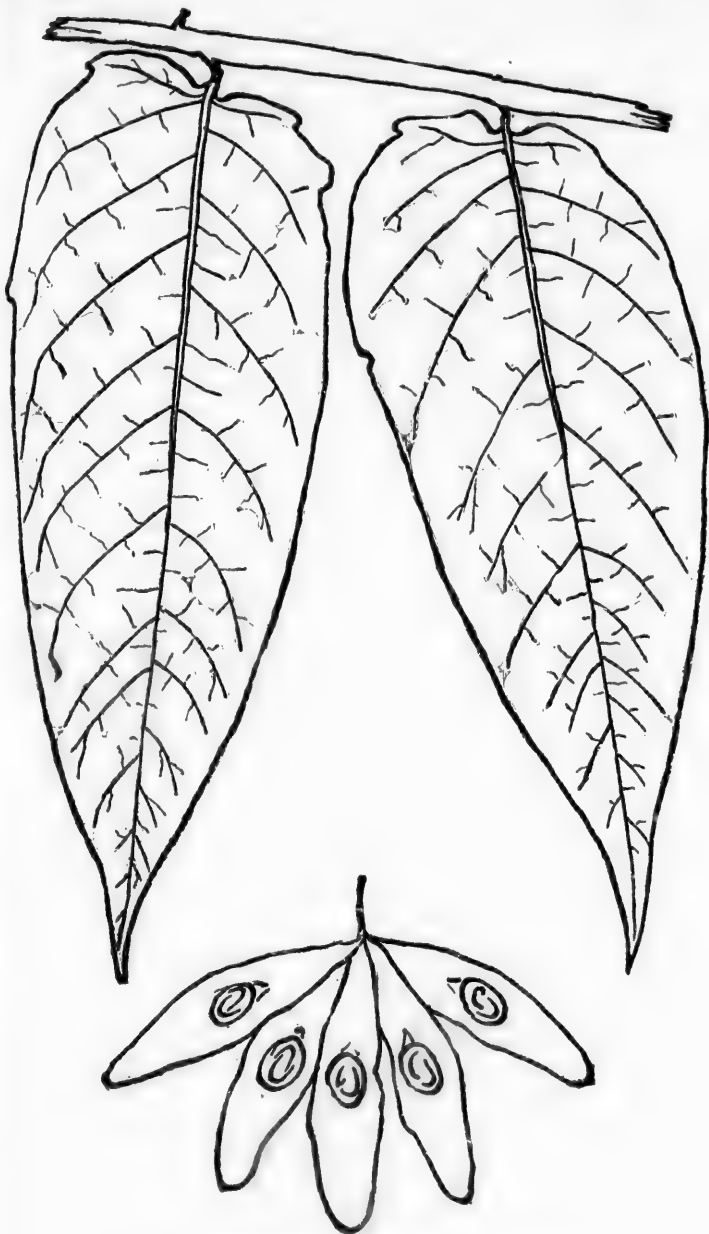


Fig. 95.—*Ailanthus*. [*A. glandulosa*, Desf.]
NATURAL SIZE.

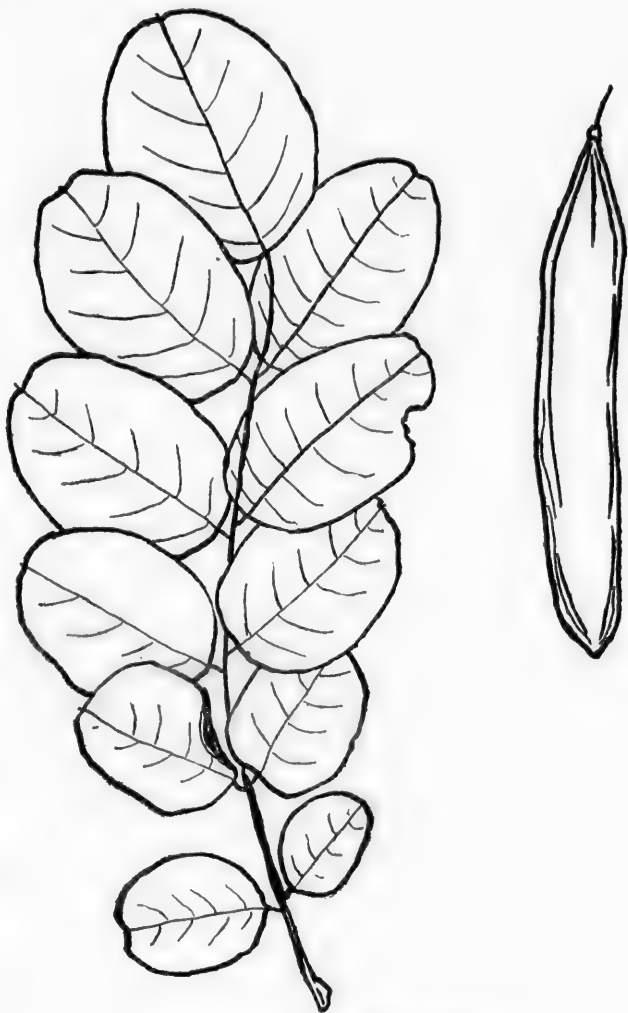
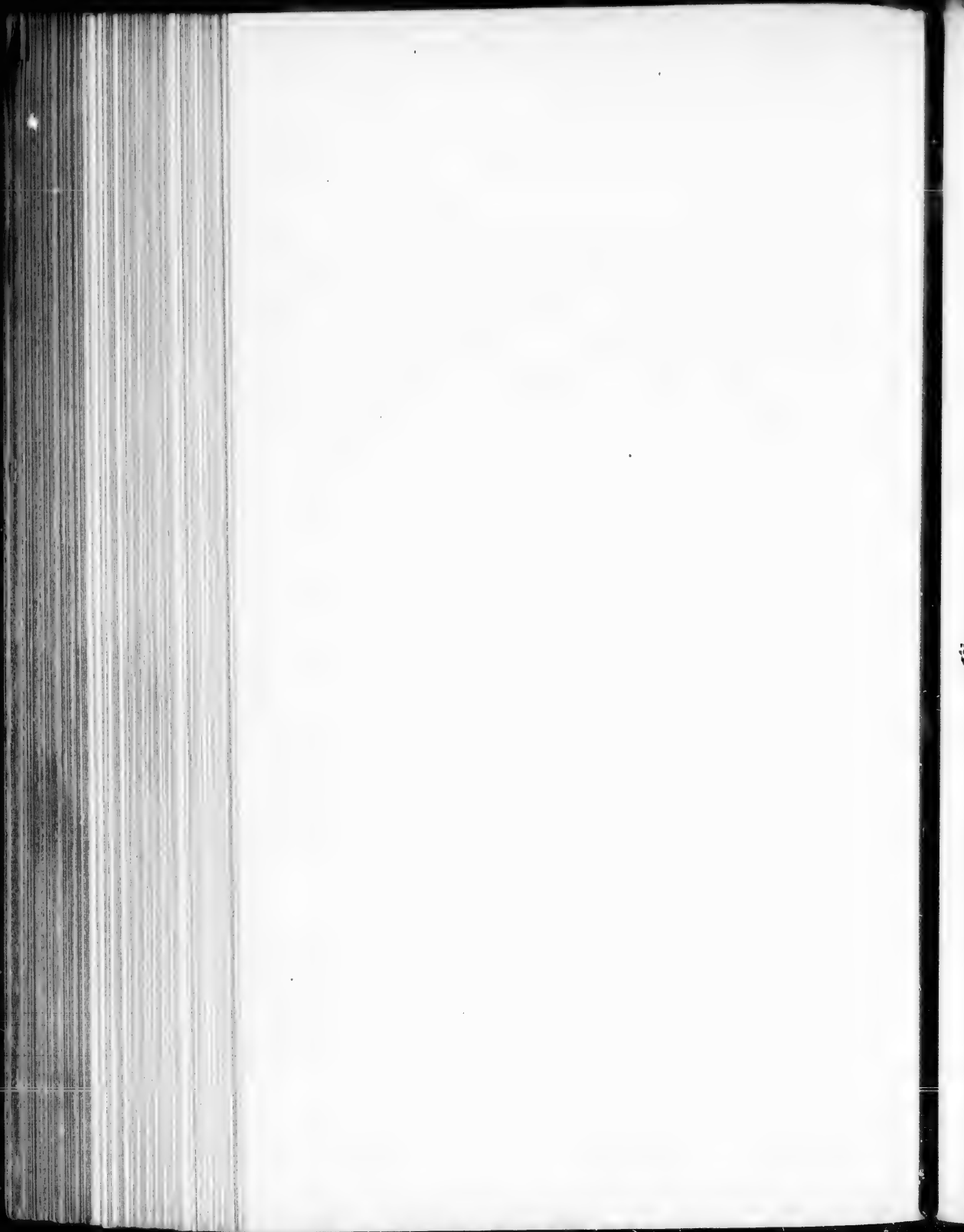


Fig. 96.—Locust. (*R. pseudacacia*, L.)
NATURAL SIZE.



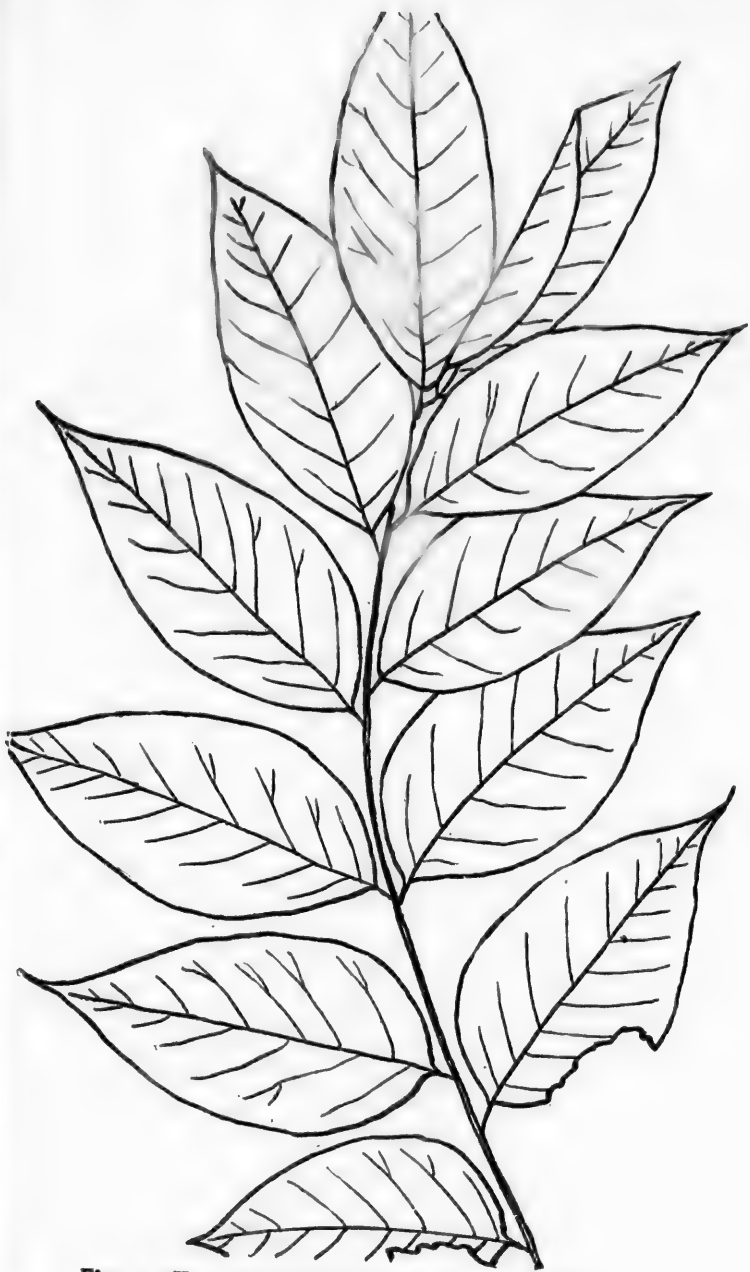


Fig. 97.—Kentucky Coffee Tree. *G. discus* (L.), Koch.
NATURAL SIZE.



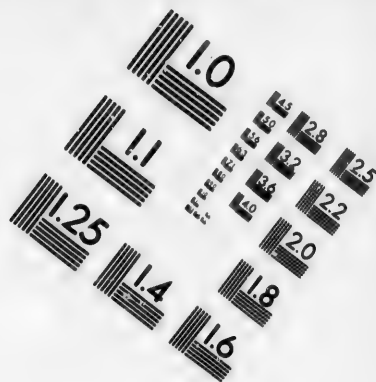
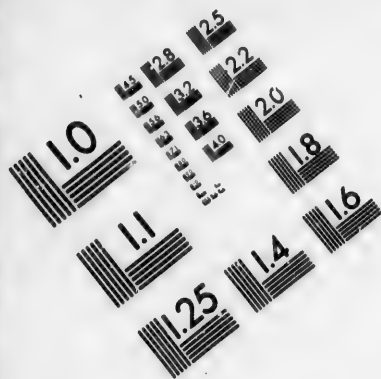
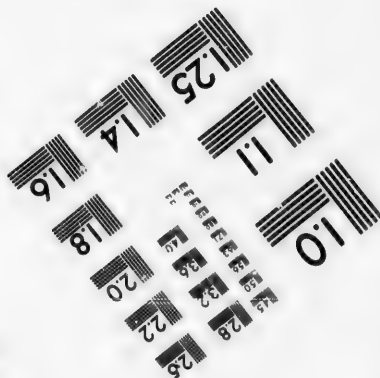
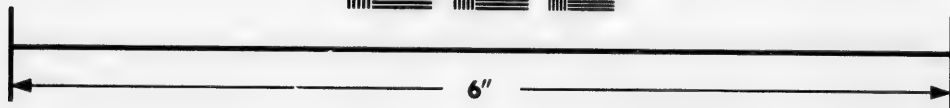
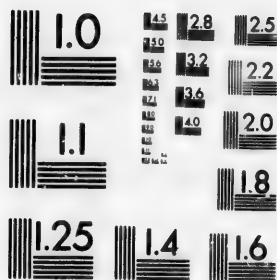


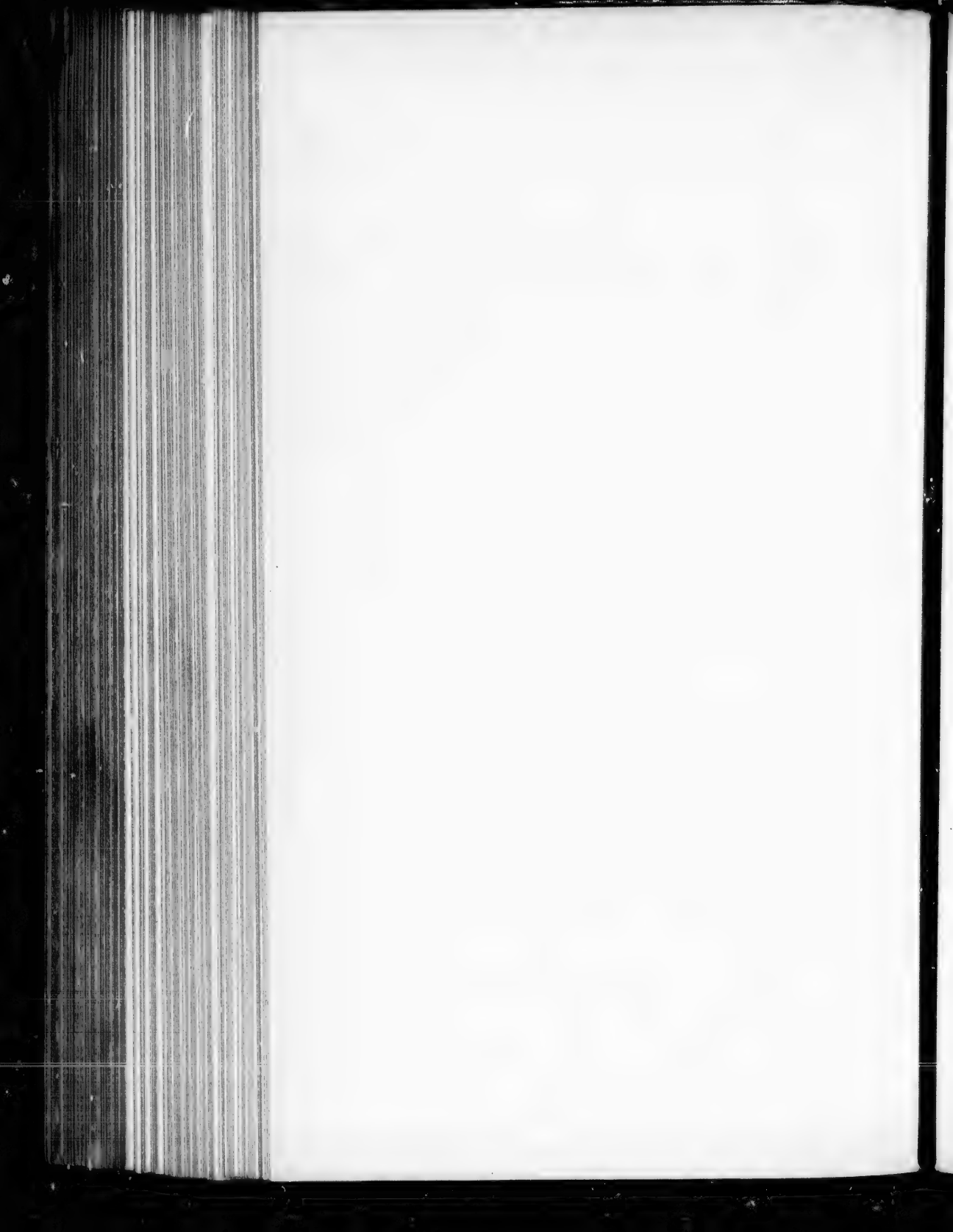
IMAGE EVALUATION TEST TARGET (MT-3)



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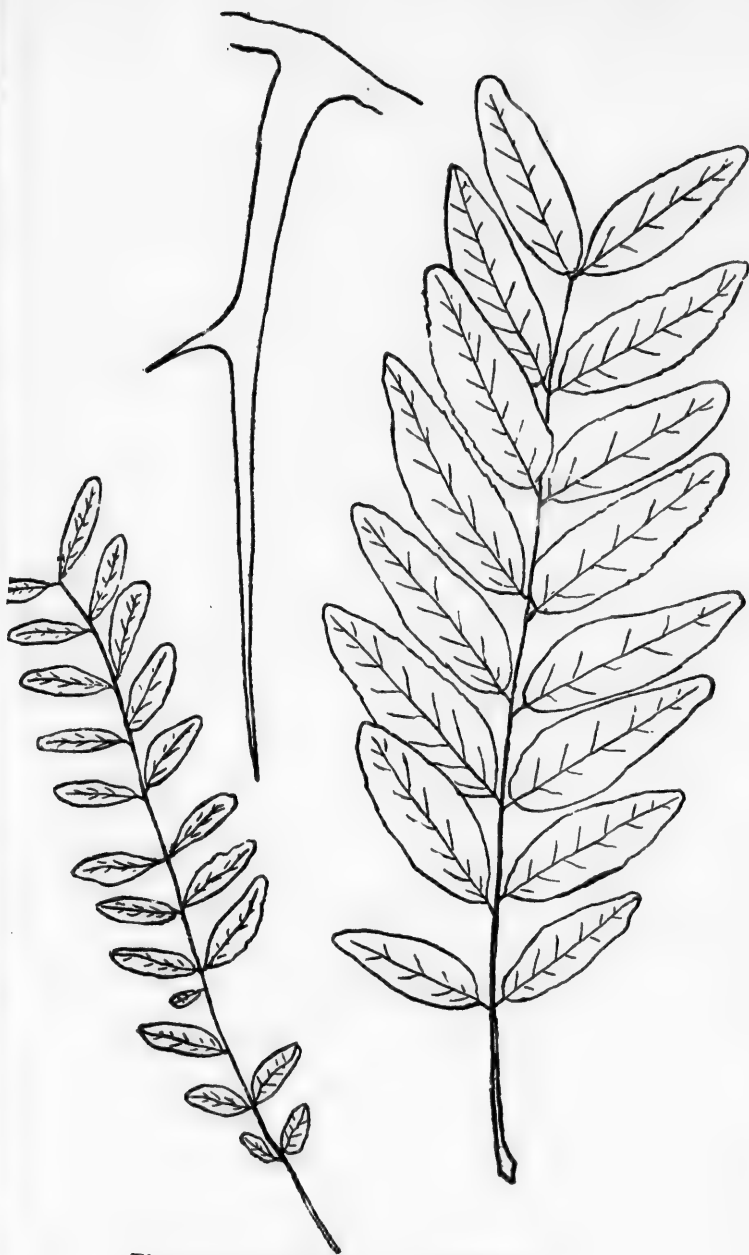


Fig. 98.—Honey Locust. (*G. triacanthos*, L.)
NATURAL SIZE.

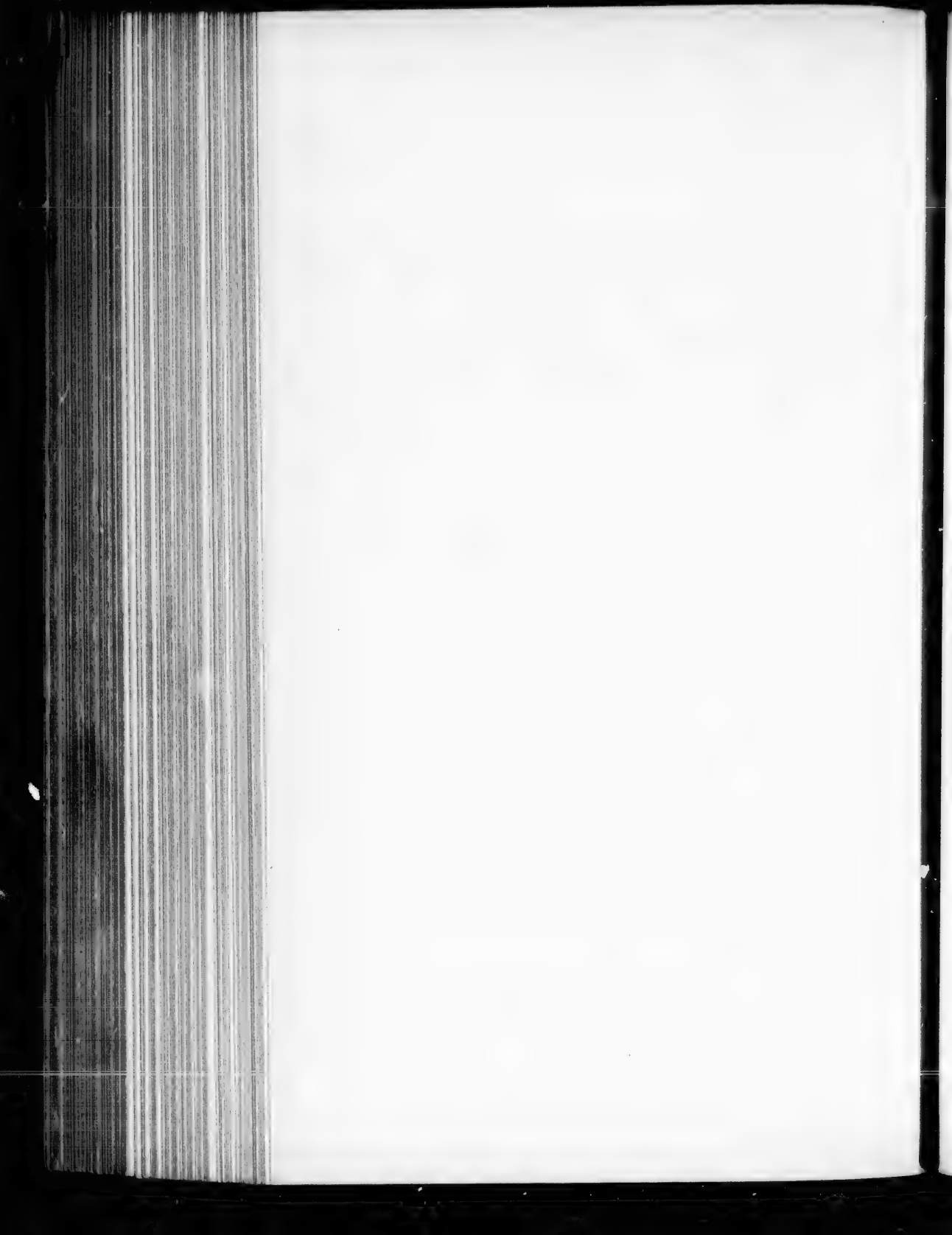
TREES WITH COMPOUND LEAVES
(FEATHER-SHAPED)

LEAVES ALTERNATE

CONTINUED

(EDGE TOOTHED)

D II



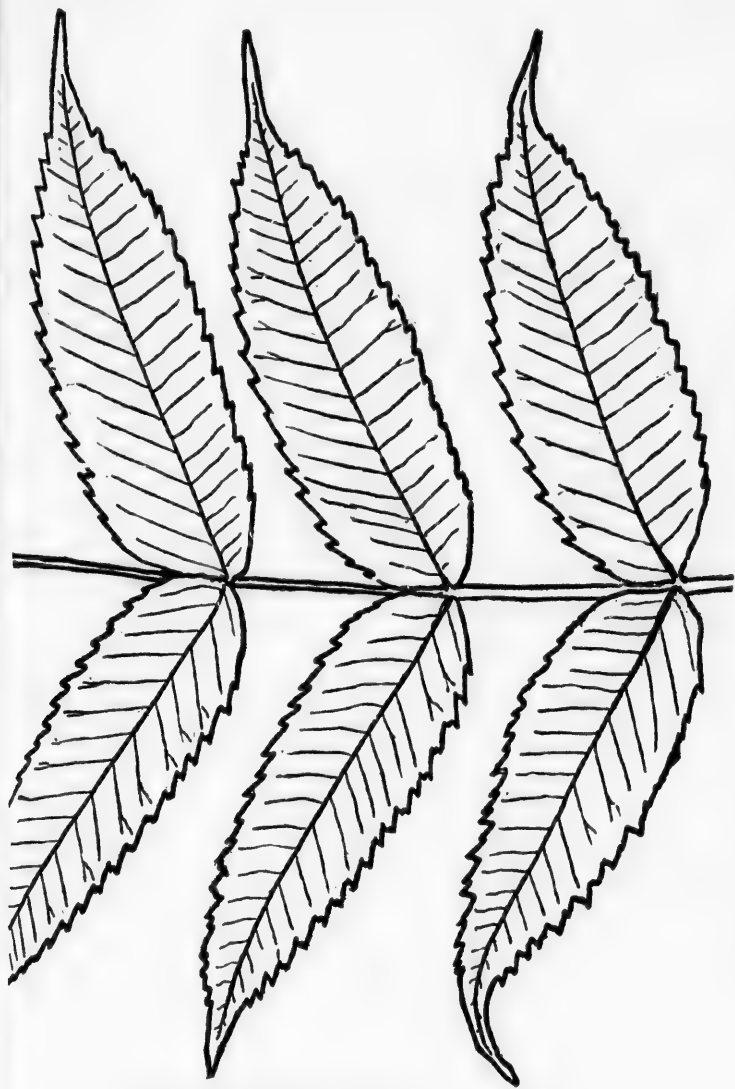
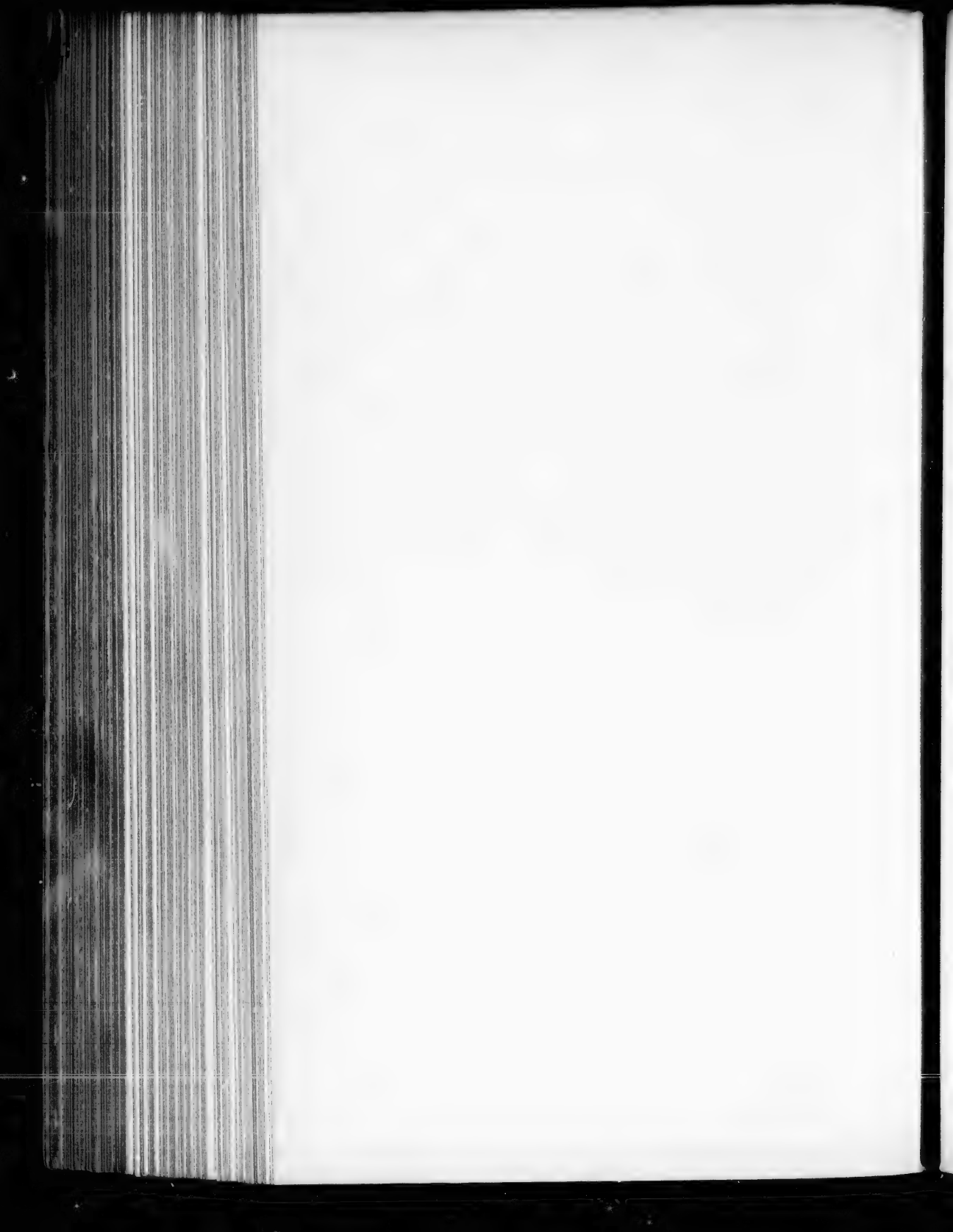


Fig. 99.—Stag-horn Sumach. (*R. typhina*, L.)
NATURAL SIZE.



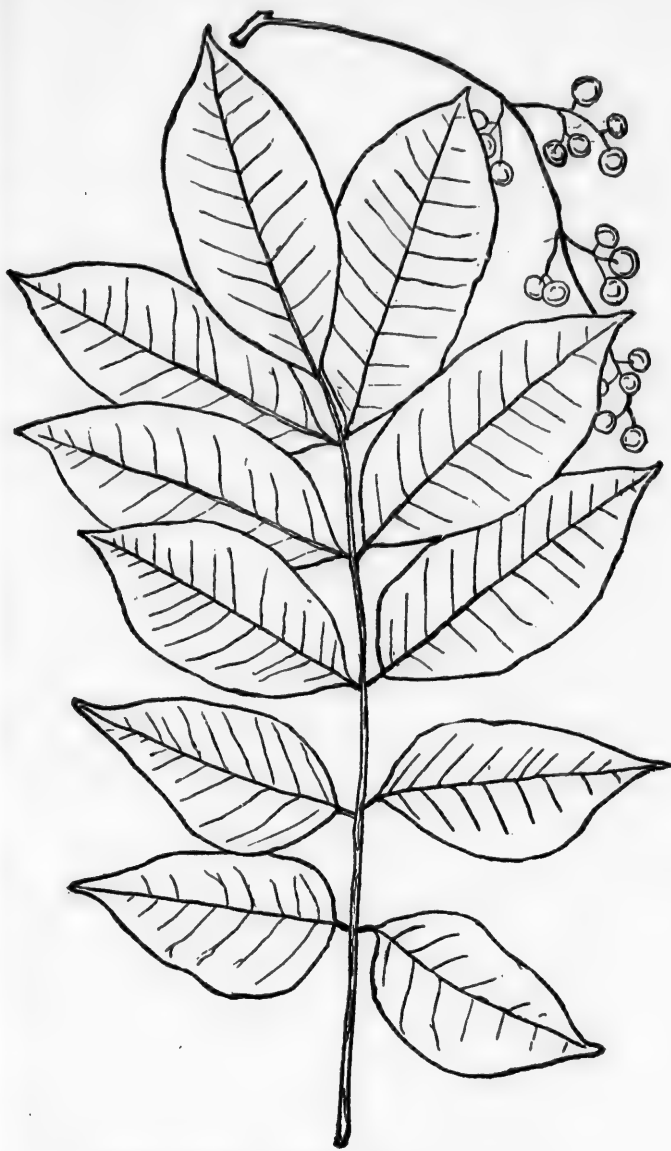


Fig. 100.—Poison Sumach. (*R. venenata*, D. C.)
NATURAL SIZE.





Fig. 101.—Mountain Ash. (*P. Americana*, D. C.)
REDUCED ONE FOURTH.

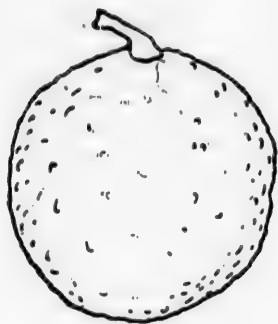


Fig. 102

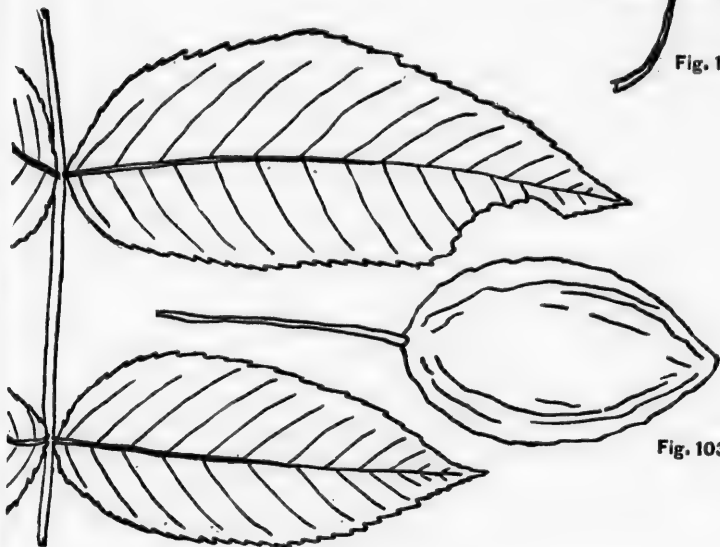


Fig. 103

Fig. 102.—Black Walnut. (*J. nigra*, L.)

Fig. 103.—Butternut. (*J. cinerea*, L.)

LEAFLETS AND FRUIT REDUCED ONE THIRD.

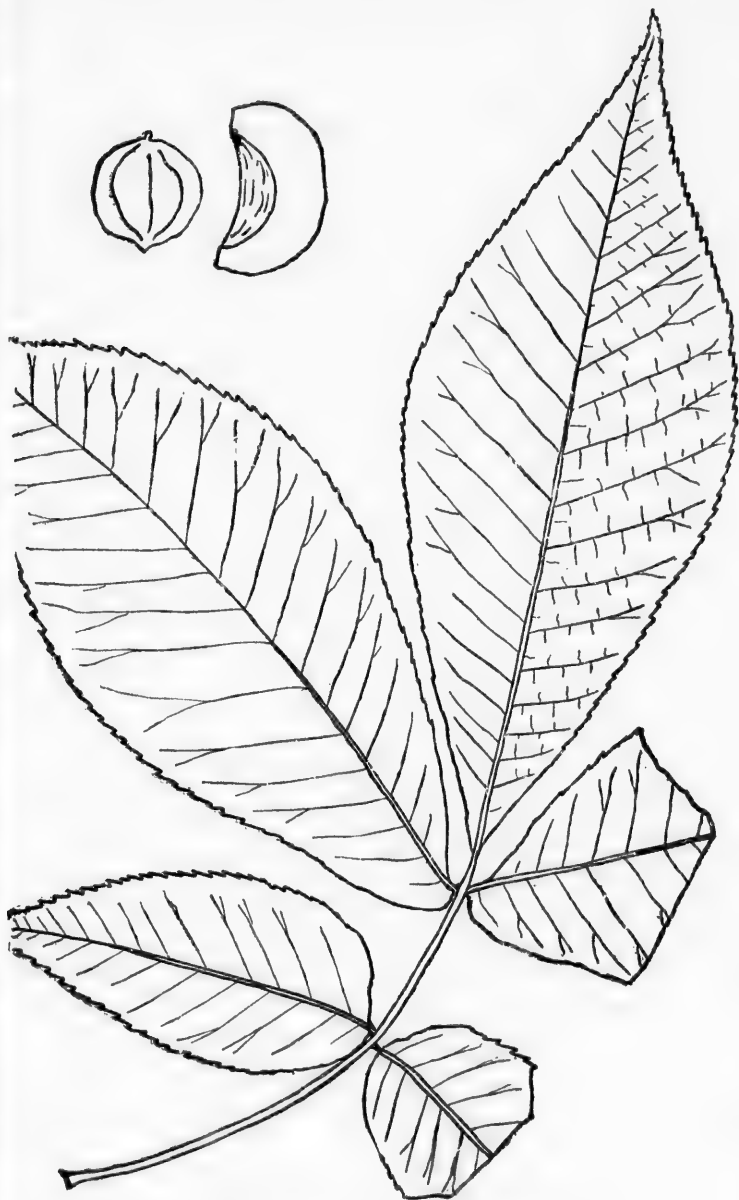


Fig. 104.—Shag-bark. *H. ovata* (Mill), Britton.
LEAF AND FRUIT REDUCED ONE THIRD.



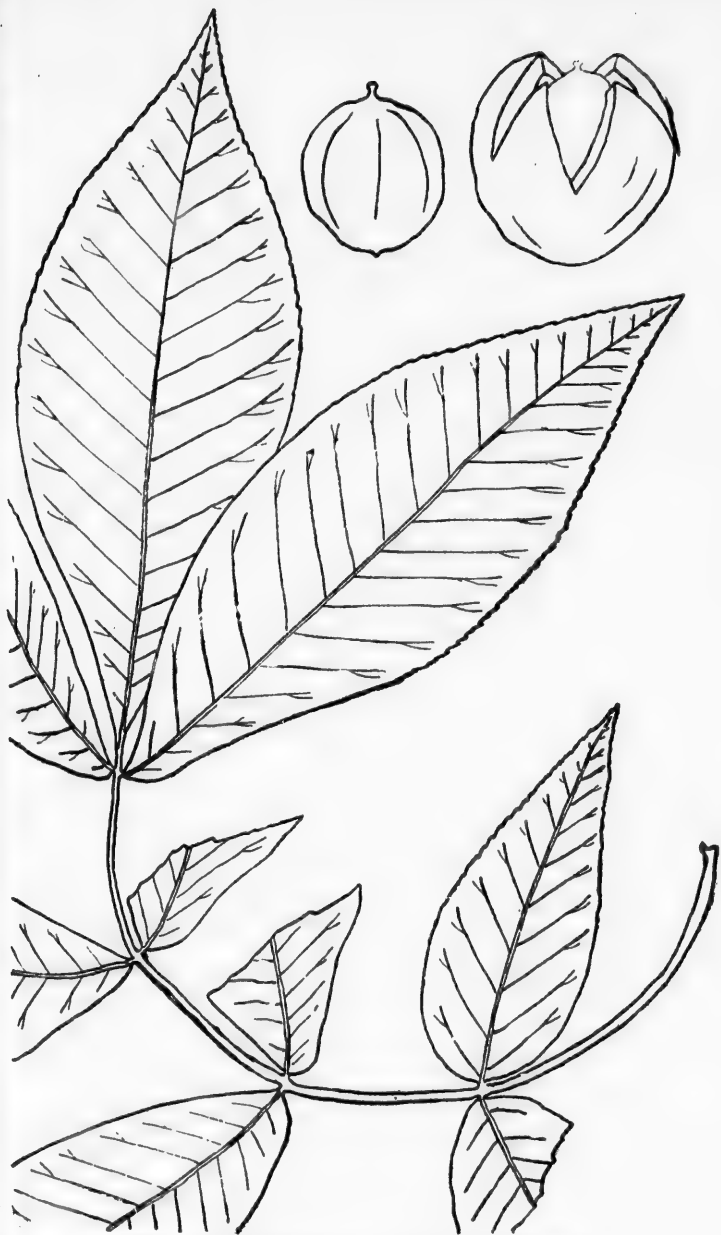


Fig. 105.—Mocker-nut. *H. alba* (L.), Britton.
LEAF AND FRUIT REDUCED ONE THIRD.

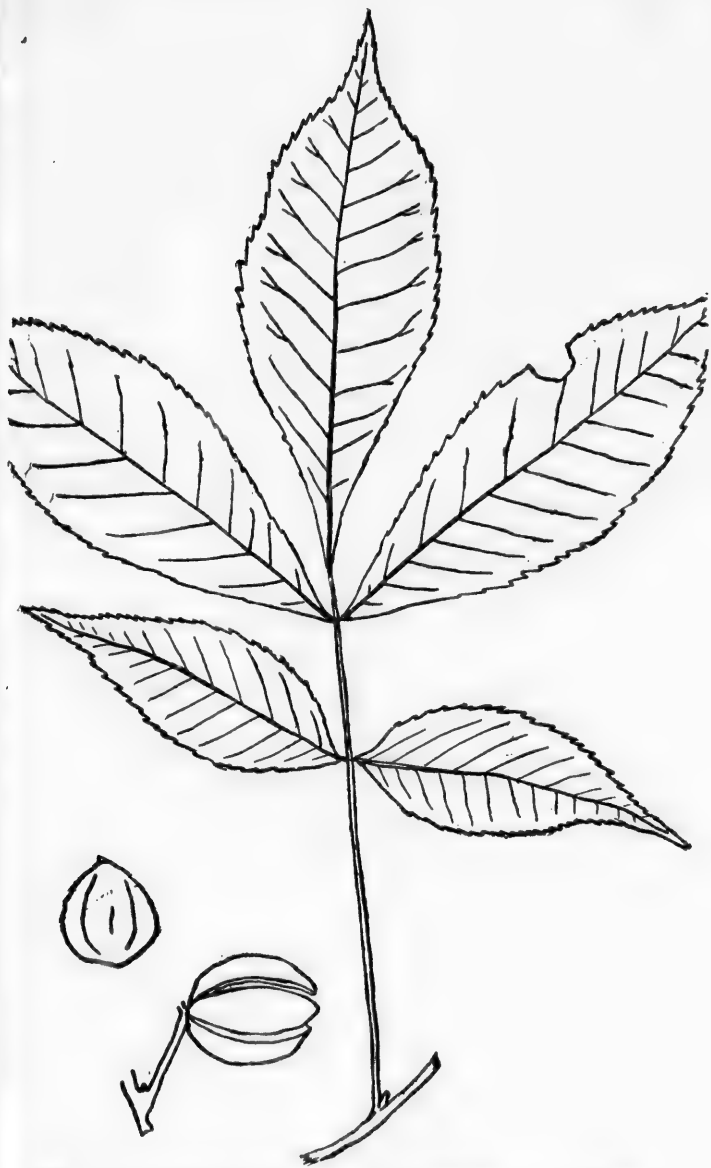


Fig. 106.—Small-fruited Hickory. *H. microcarpa* (Nutt), Britton.
LEAF AND FRUIT REDUCED ONE THIRD.

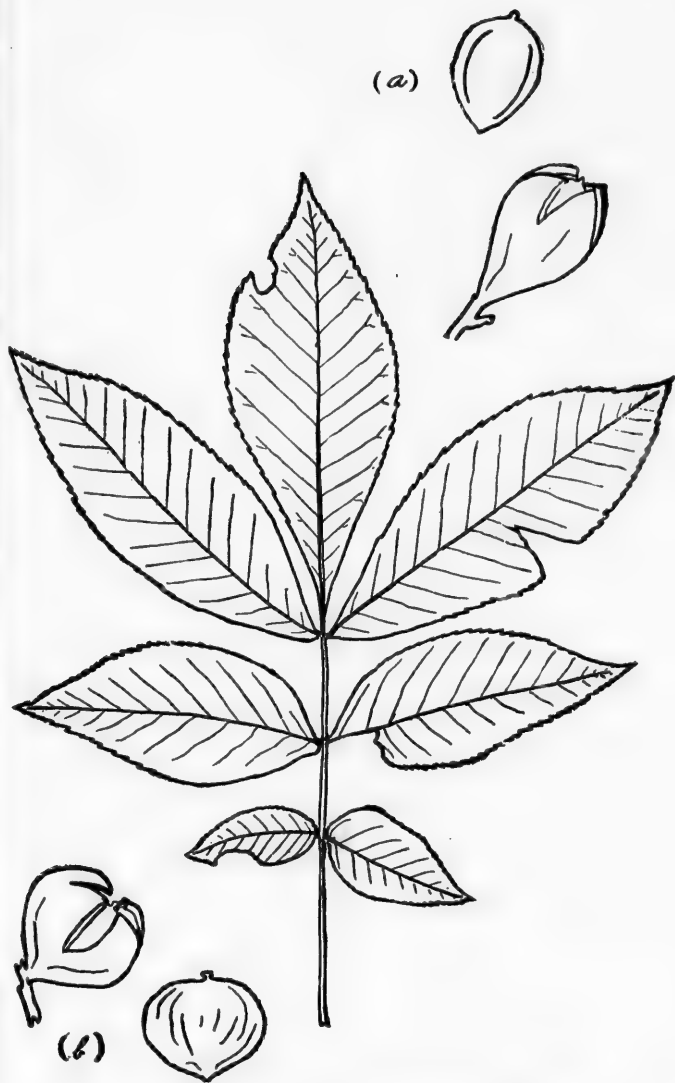


Fig. 107, *a* and *b*.—Pig-nut. *H. glabra* (Mill), Britton.
LEAF AND FRUIT REDUCED ONE THIRD.

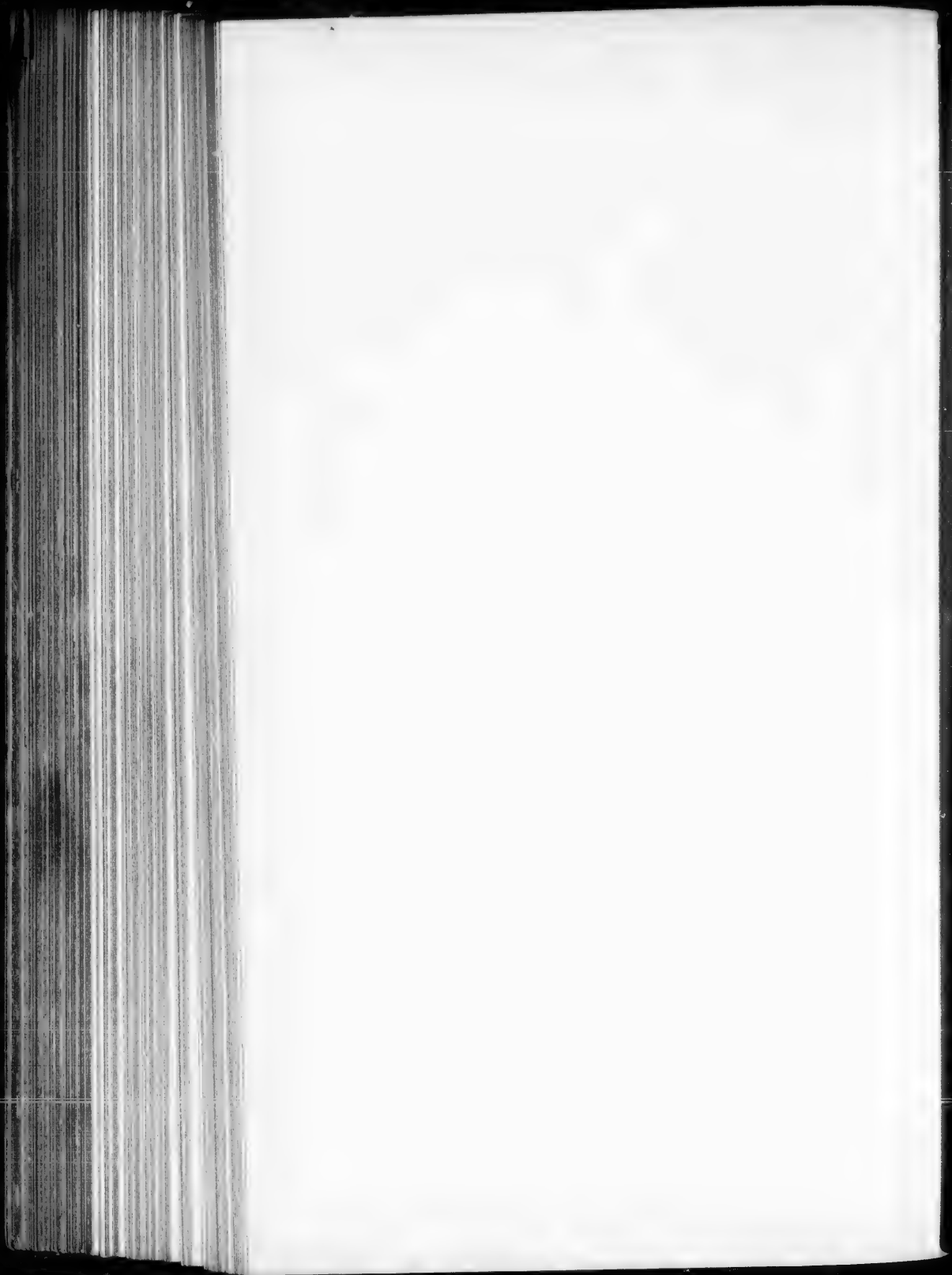




Fig. 108.—Bitter-nut. *H. minima* (Marsh), Britton.
LEAF AND FRUIT REDUCED ONE THIRD.

TREES WITH COMPOUND LEAVES
(FEATHER-SHAPED)

CONTINUED

LEAVES OPPOSITE
(EDGE ENTIRE OR TOOTHED)

E I, II



Fig. 109.—Ash-leaved Maple. (*N. aceroides*, M.)
NATURAL SIZE.

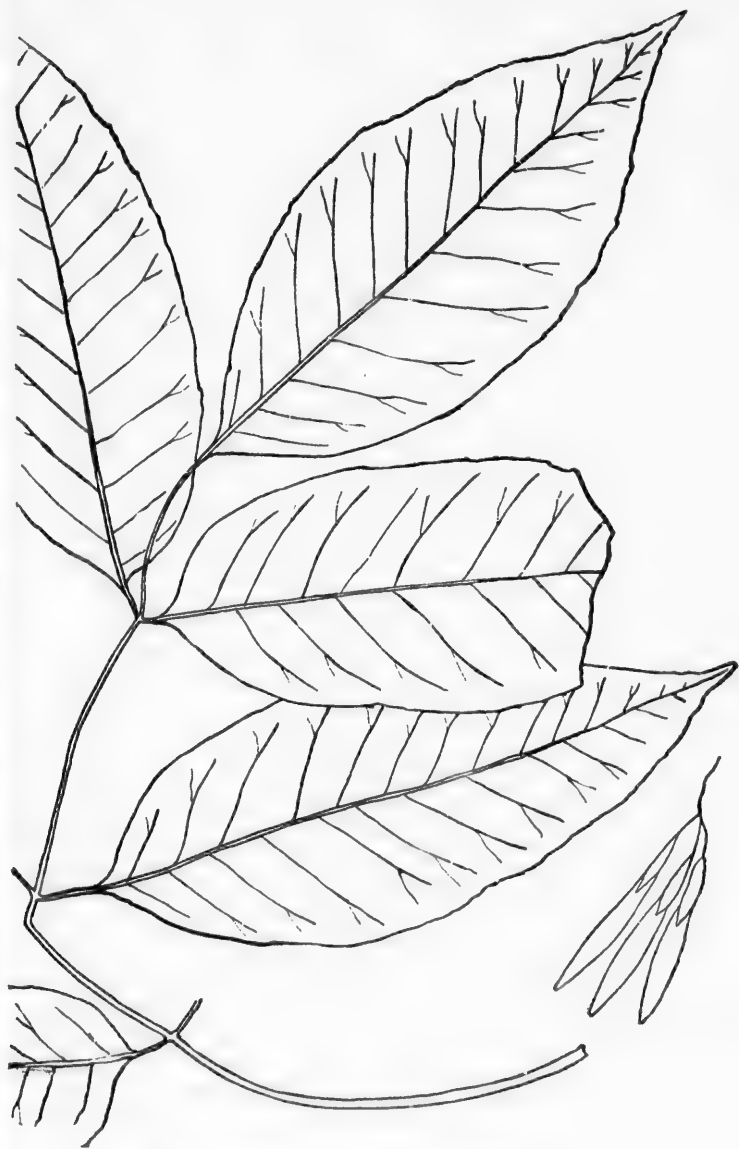


Fig. 110.—White Ash. (*F. Americana*, L.)
LEAF AND FRUIT REDUCED ONE THIRD.





Fig. III.—Red Ash. (*F. pubescens*, Lam.)
LEAF AND FRUIT REDUCED ONE THIRD.



Fig. 112.—Green Ash. (*F. viridis*, Michx., f.)
LEAF AND FRUIT REDUCED ONE THIRD.



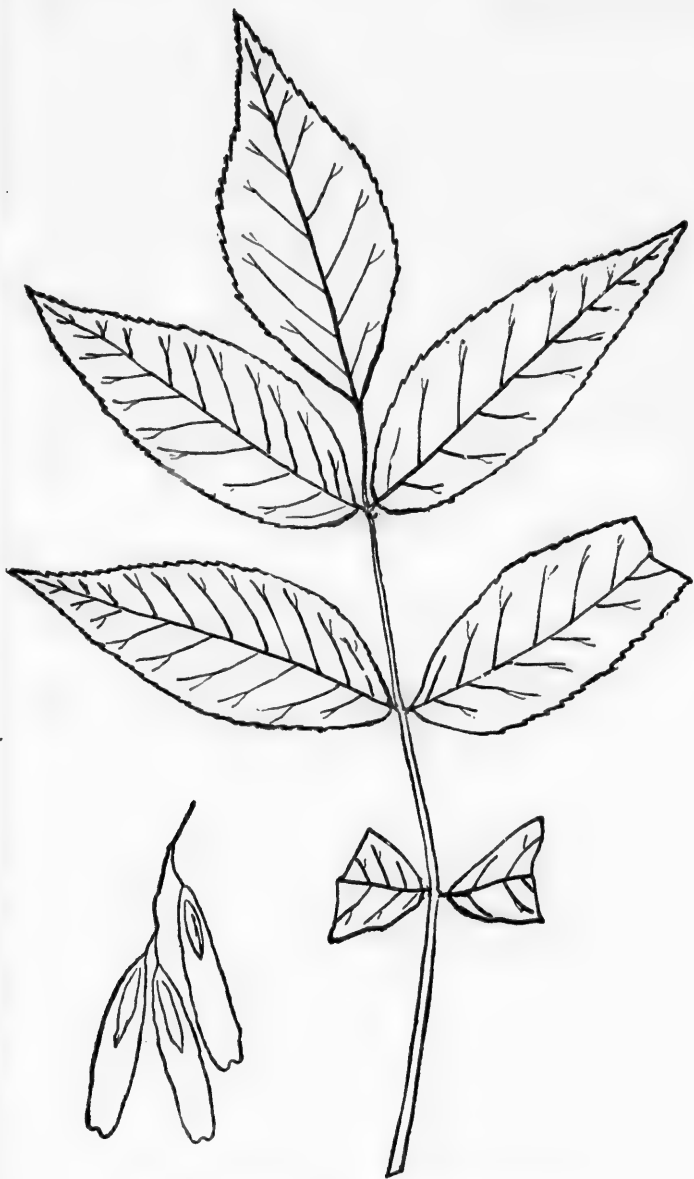


Fig. 113.—Blue Ash. (*F. quadrangulata*, Michx.)
LEAF AND FRUIT REDUCED ONE THIRD.

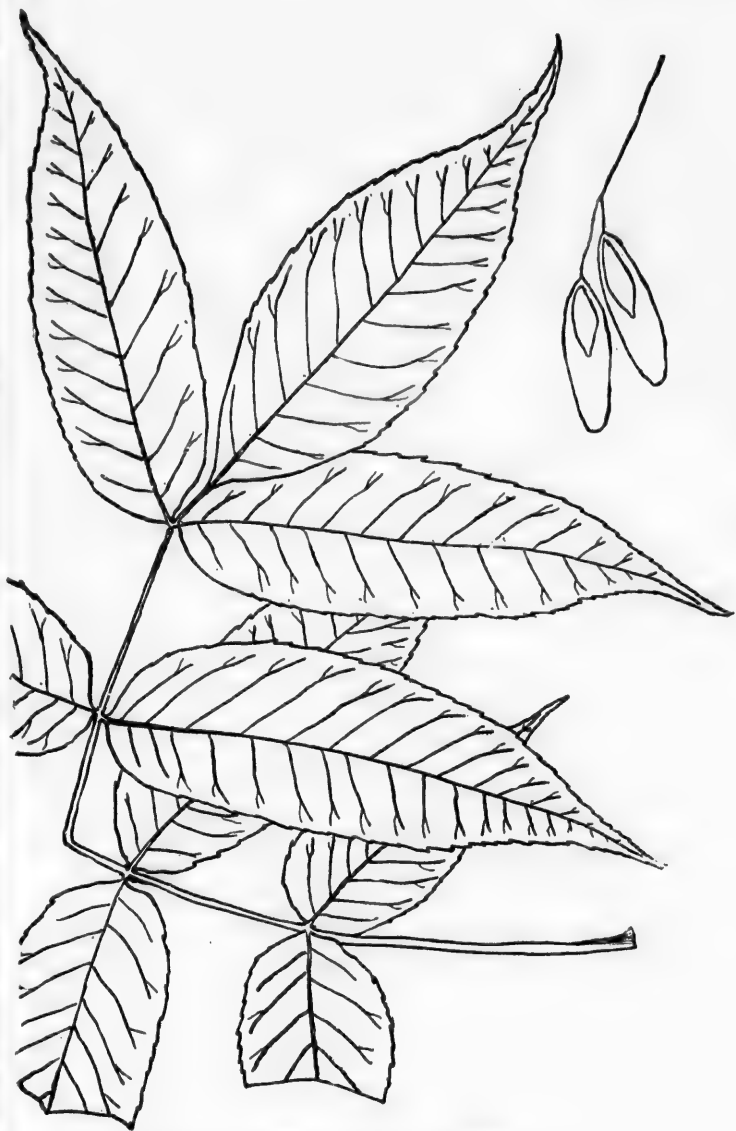


Fig. 114.—Black Ash. (*F. sambucifolia*, Lam.)
LEAF AND FRUIT REDUCED ONE THIRD.

TREES WITH COMPOUND LEAVES
(HAND-SHAPED)

LEAVES OPPOSITE
(EDGE TOOTHED)

F i

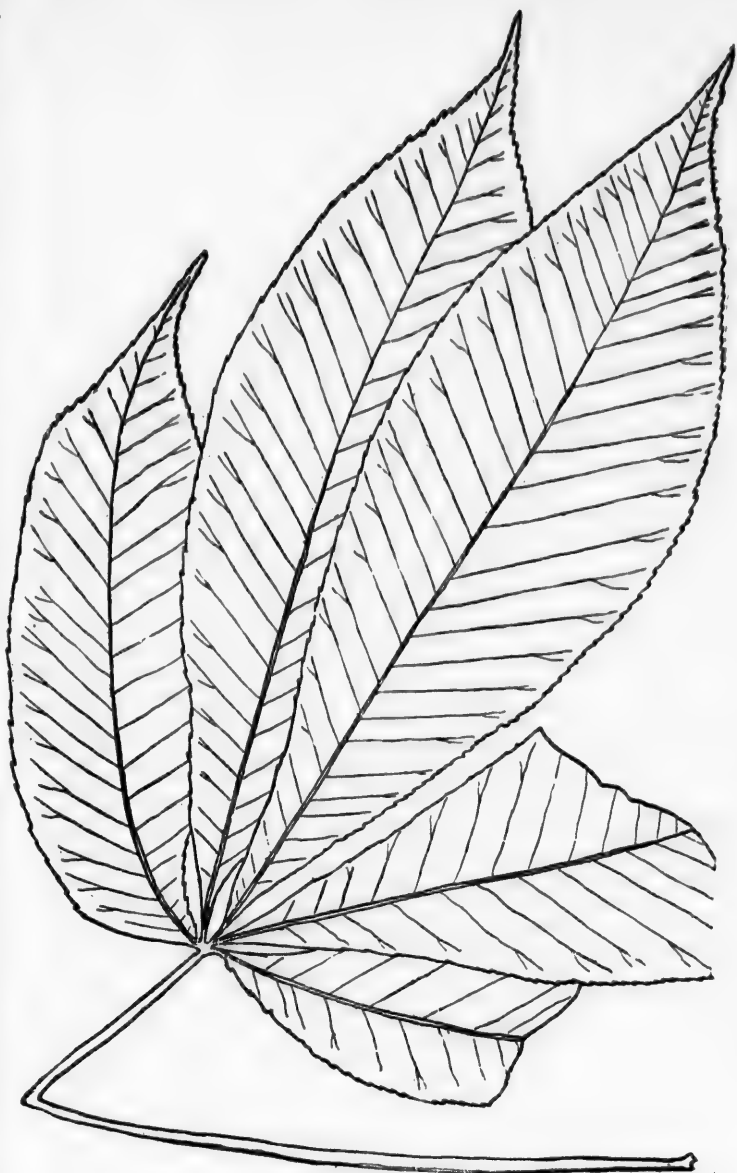


Fig. 115.—Sweet Buckeye. (*Æ. flava*, Ait.)
REDUCED ONE THIRD.

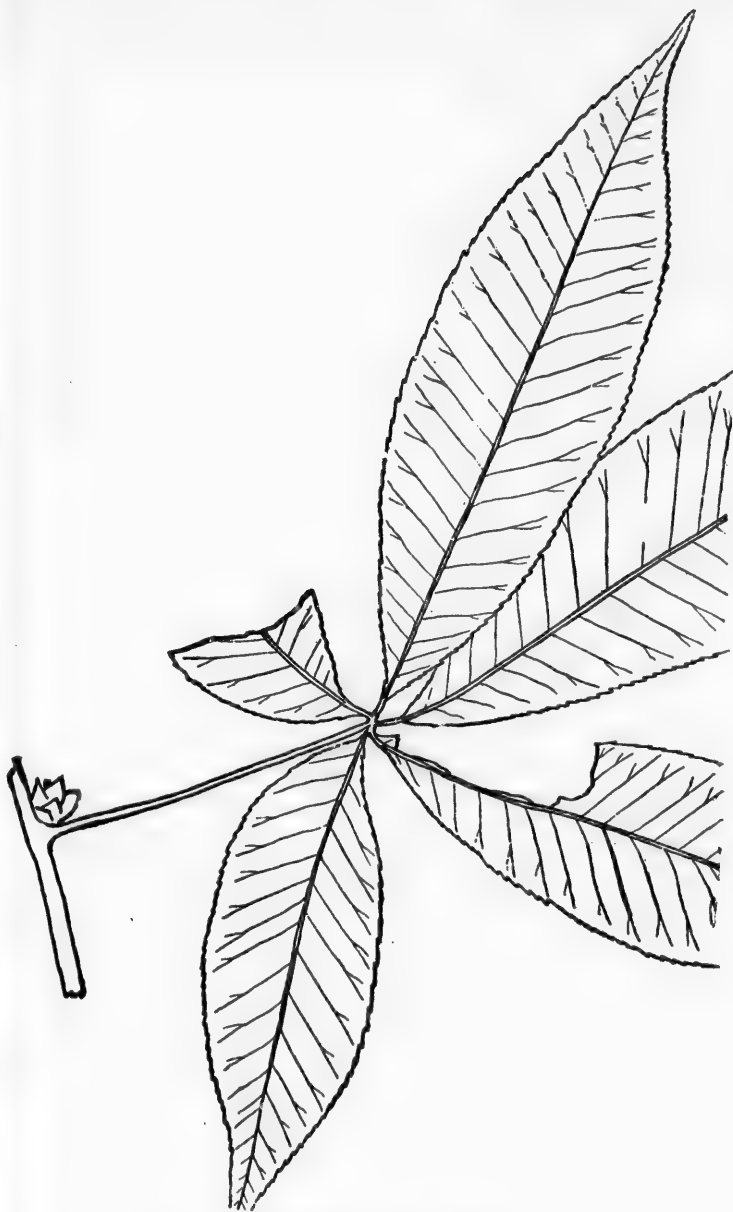


Fig. 116.—Ohio Buckeye. (*Æ. glabra*, Willd.)
REDUCED ONE THIRD.

NAMES OF OMITTED AND COMPARATIVELY UNIM- PORTANT TREES.

Tilia heterophylla. Vent.
pubescens. Ait.

Pyrus angustifolia. Ait.

Cratægus coccolnea, L. var. *mollis*.

crus-galli, L. *pyracanthifolia*.

Amelanchier Canadensis, L. var. T. and
G.

Ulmus racemosa. Thomas.

Celtis occidentalis, L. var. *crassifolia*.

Salix amygdaloides. Anders.

Quercus macrocarpa, Michx. var. *olivæ-
formis*.

Quercus coccolnea, Wang. var. *ambigua*,
Gray.

(Of nine hybrid oaks, most are outside our
limits or entirely local.)

Catalpa speciosa. Ward.

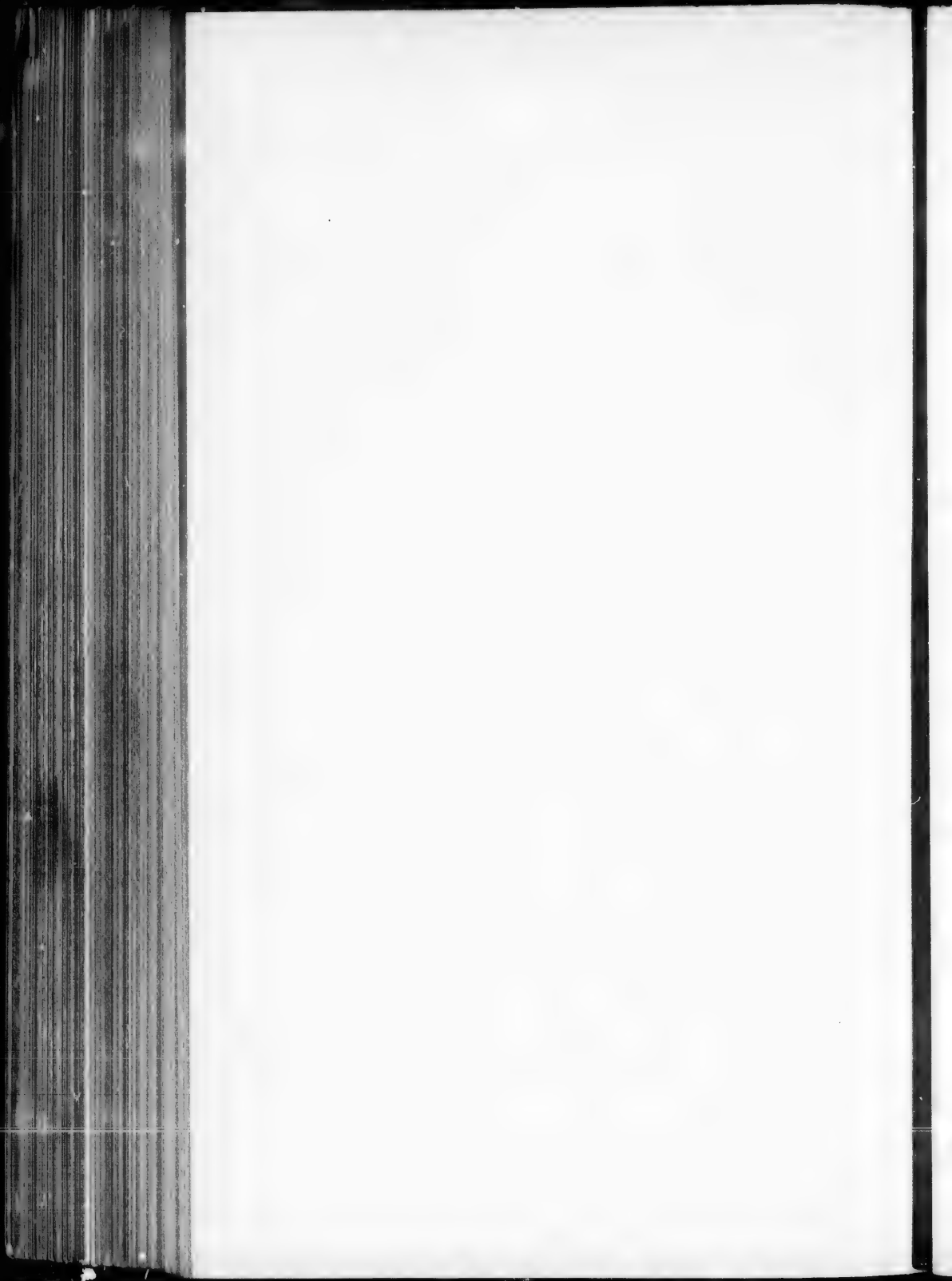
Robinia viscosa. Vent.

Gleditschia triacanthos, L. var. *inermis*,
and var. *brachycarpus*.

Rhus typhina, L. var. *laciniata*.

Pyrus sambucifolia

Hicoria sulcata (Willd). Britton.





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The names of genera are given in SMALL CAPITALS, of species and varieties in Roman type. The names of introduced species are enclosed by brackets.

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